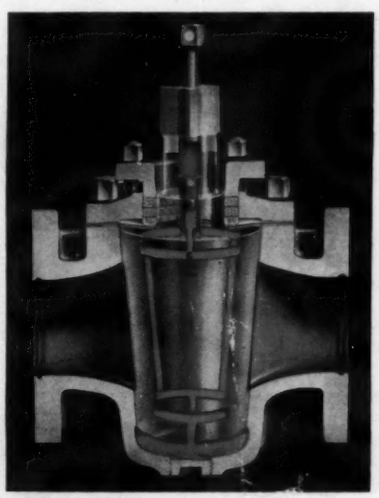
WESTERN GAS

Library of Congress, C
Att: Periodical Division

only 1/2¢ OUT OF A DOLLAR FOR NORDSTROM VALVE REPLACEMENT PARTS (AVERAGE)

For every $1000.00 worth of Nordstrom Lubricated Plug Valves in service during the past 15 years, the cost of replacement parts has averaged less than $5.00—less than ½ of 1% of the initial cost. This is pretty conclusive evidence of the indestructible character of the Product and its utter economy. Many Nordstroms have been in continuous service for eight, ten, twelve, fifteen years, without a penny paid out for replacement parts. One of the largest gas utility corporations has purchased more than $850,000.00 worth of Nordstroms during the past 14 years. Their total purchases of replacement parts is only $127.89, and practically all of the valves are in service and working today. Write for Bulletin.

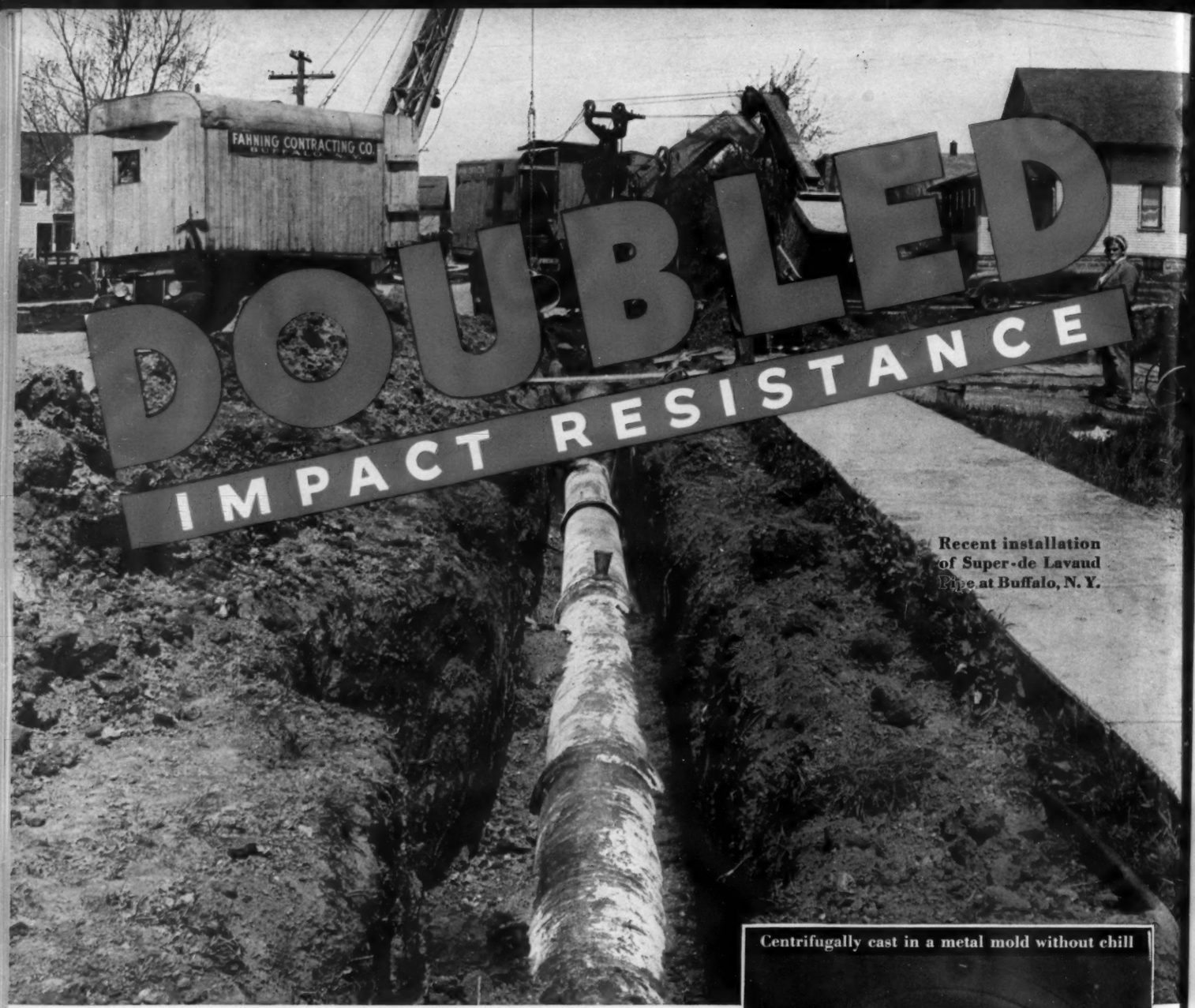


Numerous large oil companies figure monthly repair costs on severe service lines such as in oil pump houses at $1.00 per inch per valve per month. This means $6.00 per month for a 6" valve. Installation of Nordstrom Valves cuts this high cost of repairs to the irreducible minimum.

Compare this amazingly low replacement-part cost with that of other valves requiring frequent renewal of discs, seats, stems and wedges. The comparison should interest your Purchasing Department.

MERCO NORDSTROM VALVE CO. *A Subsidiary of* **PITTSBURGH EQUITABLE METER CO.**

Main Offices: Pittsburgh, Penna. *Branch Offices:* New York, Buffalo, Philadelphia, Columbia, Memphis, Chicago, Kansas City, Tulsa, Houston, Los Angeles, Oakland

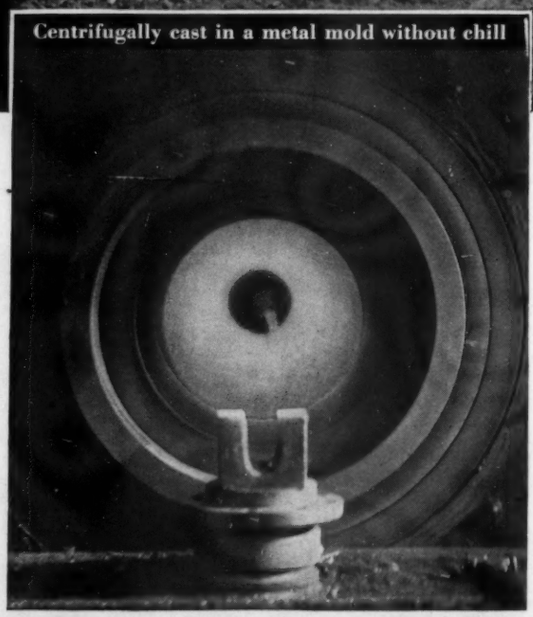


DOUBLED IMPACT RESISTANCE

Recent installation of Super-de Lavaud Pipe at Buffalo, N. Y.

WE MAKE both pit-cast and centrifugally-cast pipe. Our production and laboratory facilities have been, and continue to be, devoted to improving both types of pipe to the limit of the potentialities of each method. Our test-records for two years, confirmed in the field through the installation of nearly 9-million feet, convince us that Super-de Lavaud Cast Iron Pipe is the strongest, toughest, most ductile pipe we have ever produced. Super-de Lavaud Pipe is *centrifugally cast in a metal mold without chill.* Impact strength is *doubled* without loss in tensile or bursting strength. The process is described in a booklet sent on request.

Centrifugally cast in a metal mold without chill



U.S. SUPER-de LAVAUD PIPE

CAST WITHOUT CHILL IN A METAL MOLD

UNITED STATES PIPE AND FOUNDRY CO., General Office: BURLINGTON, N. J.

Foundries and Sales Offices throughout the United States

DRESSER

BUILDS A LEAK-PROOF PRODUCT FOR EVERY PIPE LINE PROBLEM

COUPLINGS AND LONG SLEEVES FOR NEW JOINTS ON ALL KINDS AND SIZES OF PLAIN END PIPE
CLAMPS FOR VARIOUS TYPES OF DEFECTIVE JOINTS ON EXISTING LINES
SPLIT SLEEVES FOR COMPLETELY ENCLOSING AND REPAIRING DEFECTIVE PIPE AND JOINTS ON EXISTING LINES
STYLE 38, 36"
STYLE 38, 12" I.D.
STYLE 53, 12" C.I.P.
STYLE 40, 6" I.D.
STYLE 38, 1¼" I.D. SERVICE COUPLING
STYLE 65, 1" I.D.
STYLE 73, 12" I.D.
STYLE 60
STYLE 52-A, 12" I.D.
STYLE 41
STYLE 26, 12" C.I.P.
STYLE 55
STYLE 57, 12" C.I.P.
STYLE 57, 12" C.I.P. MULTIPLE INSTALLATION
STYLE 54-A, 16" O.D.

COUPLINGS AND LONG SLEEVES

STYLE 38 Steel Couplings make PERMANENTLY TIGHT, flexible connections between plain-end pipe sections, are quickly and easily installed by unskilled labor, are rubber gasketed, and absorb all normal pipe movements. Sizes: 3/16" I. D. to largest pipe diameter for all kinds of pipe.

STYLE 40 Long Sleeves serve the same purpose as Style 38's, but are installed on widely separated pipe ends. Sizes: ½" I. D. to 24" O. D. inclusive.

STYLE 53 Cast Couplings are like Style 38, except cast. Sizes: 4" to 30" inclusive.

STYLE 65 Compression Couplings have screw followers instead of bolts to compress the gaskets. Sizes: 3/16" I. D. to 2" I. D. incl.

CLAMPS

Dresser Clamps repair leaks in various types of pipe joints. They can be applied by unskilled labor without interruption of the service, give a permanently tight repair and are made by the world's largest and oldest builder of clamps.

STYLE 60 Bell Joint Clamps are adjustable, have a continuous gasket recess, and a sealing "pack" scientifically designed and PROVED. Sizes: 3" to 60" inclusive.

STYLE 41 (and 4) Collar Clamps prevent and repair leaks in screw collars (screw couplings). Sizes: ¾" I. D. to 12" I. D. inclusive.

STYLE 55 Porous Weld Clamps permanently repair porous but not broken welds. Sizes: 2" O. D. to 26" O. D. inclusive.

SPLIT REPAIR SLEEVES

Dresser Split Sleeves completely enclose and permanently repair breaks, splits, holes and defective joints of all types. They can be applied quickly, by unskilled labor, in any weather, under water, etc. All are rubber packed. Special styles of welded steel sleeves are built for unusual conditions or odd sizes.

STYLE 52-A Sleeves repair welds, screw collars, splits, holes, etc. Inside length: 8". Maximum working pressure: 500 lbs. per sq. in. Sizes: 4" I. D. to 26" O. D. inclusive.

Style 73 Sleeves are used for the same purpose as Style 52-A, except maximum working pressure is 250 lbs. per sq. in. Inside length: 8". Sizes: 2" I. D. to 12" I. D. inclusive.

STYLE 26 Sleeves repair broken bells on cast iron pipe. Maximum working pressure: 150 lbs. per sq. in. Sizes: 3" to 24" inclusive.

Style 57 Sleeves are identical with Style 73, except made for cast iron pipe sizes. Maximum working pressure: 250 lbs. per sq. in. Sizes: 3" to 12" inclusive.

Multiple Installations of two or more Style 57 or 73 Split Sleeves, for repairs longer than 8", can be made with simple joiner parts.

Style 54-A Sleeves repair leaking joints of the bolted coupling type on steel pipe. Maximum working pressure: 500 lbs. per sq. in. Sizes: 2" I. D. to 26" O. D. inclusive.

WRITE FOR FURTHER INFORMATION!

S. R. DRESSER MANUFACTURING COMPANY

BRADFORD, PA. (In Canada - DRESSER MFG. COMPANY, LTD., 32 Front St., W. Toronto, Ont.)

ADVERTISERS' INDEX

The American Brass Company	27
American Cast Iron Pipe Co.	56
American Meter Company	8
American Stove Co.	—
Barber Gas Burner Co.	46
The Barrett Company	—
H. R. Basford Company	52
The Bristol Company	55
The Cast Iron Pipe Research Assn.	3
The Chaplin-Fulton Mfg. Company	40
The Cooper-Bessemer Corporation	4
Daniel Orifice Fitting Co.	40
Dearborn Chemical Company	54
Denver Fire Clay Co.	50
Detroit-Michigan Stove Company	31
S. R. Dresser Mfg. Company	1
Electrogas Furnace & Mfg. Co.	50
Electrolux Refrigerator Sales, Inc.	29
Ensign Carburetor Co.	47
Fluor Corporation, Ltd.	5
Fraser Furnace Company	52
General Ceramics Company	48
James Graham Manufacturing Co.	53
Handbook Butane-Propane Gases, 2nd Edition	48
Inland Mfg. Co.	51
Johnson Gas Appliance Co.	51
Johns-Manville	7
Kerotest Mfg. Co.	37
Merco Nordstrom Valve Co.	Front Cover
Minneapolis-Honeywell Regulator Co.	40
Mueller Co.	3rd Cover
L. J. Mueller Furnace Co.	49
National-Superior Co.	33
National Tube Company	23
Natural Gas Equipment Inc.	47
Nemec Combustion Engineers	32
Pacific Coast Gas Association	43
Pacific Gas and Electric Company	45
Pacific Gas Radiator Co.	54
Payne Furnace & Supply Co.	48
Peerless Manufacturing Corp.	50
Pittsburgh Equitable Meter Co.	Front Cover
Pressed Steel Tank Company	36
Reliance Regulator Corp.	34
Republic Steel Corporation	Back Cover
Reynolds Gas Regulator Co.	33
Robertshaw Thermostat Co.	44
Geo. D. Roper Corp.	—
Safety Gas Main Stopper Co.	49
M. B. Skinner Co.	6
Spencer Thermostat Co.	36
The Sprague Meter Company	53
Surface Combustion Corp.	—
The Texacone Co.	52
United States Pipe and Foundry Co.	2nd Cover
Ward Heater Co.	46
Webster Engineering Co.	25
Welsbach Company	46
John Zink Burners	30

WESTERN GAS

"Reg. U. S. Pat. Off."

Publication Office: 810 South Spring Street, Los Angeles, Calif.—Phone Michigan 1481
District Office: 1064 Peoples Gas Building, Chicago — Phone Harrison 8536

JAY JENKINS, Publisher GEORGE H. FINLEY, Editor CRAIG ESPY, Mid-Western Manager
W. G. RUSSELL, Field Representative

Contents for August, 1935

Recent Developments in Use of Copper Pipe for Gas Distribution . 9
By F. A. Hough

25 Methods for Developing Sales Leads . *By W. C. Mainwaring* 12

Uncle Sam—Fuel Buyer . . . . . *By George W. Bean* 14

Ice Solves a Distribution Problem . . . . *By Irwin H. Witt* 15

Central Heating Essentials . . . . . *By E. L. Payne* 16

Rockford's Cooperative Water Heater Rental-Purchase Campaign . 17
By H. S. Oyen

Regulator Freezing . . . . . *By M. A. Hardie, Jr.* 18

Tacoma Conference Stresses Modern Selling 20

BUTANE-PROPANE NEWS 35

Substituting Butane-Air on Small Manufactured Gas Properties 35

MEASUREMENT AND CONTROL 38

Design and Application of Pressure Elements 38
By Virgil E. Schultz

Annual Corrosion Conference at Los Angeles 42

MEMBER
PERIODICAL PUBLISHERS INSTITUTE

MEMBER
AUDIT BUREAU OF CIRCULATIONS

August, 1935. Volume XI, Number 8. WESTERN GAS is published monthly by Western Business Papers, Inc., at 810 South Spring Street, Los Angeles, California. Subscription price (in advance), 25 cents the copy; $2.00 per year; 2 years, $3.00; $3.00 per year foreign. Entered as second class matter June 1, 1925, at the postoffice at Los Angeles, under the Act of March 3, 1879. Copyright 1935.

OFFICIAL PUBLICATION: Pacific Coast Gas Association; Southern California Meter Association

"LONG LIFE PIPE"

with gas-tight mechanical joints

Rigid tests conducted by the laboratory of the American Gas Association have demonstrated that mechanical joints made by members of The Cast Iron Pipe Research Association are *bottle-tight*. History provides incontrovertible evidence of cast iron pipe's unequalled long life. Thus assurance is made doubly sure for the distribution engineer who specifies cast iron pipe with mechanical joints.

The Cast Iron Pipe Research Ass'n, Thos. F. Wolfe, Research Engineer, 1015 Peoples Gas Bldg., Chicago, Ill.

CAST IRON PIPE

METHODS OF EVALUATING BIDS NOW IN USE BY ENGINEERS RATE THE USEFUL LIFE OF CAST IRON PIPE AT 100 YEARS

TRADEMARK REG.

From SAN DIEGO *to* SAN FRANCISCO

THE NATURAL-GAS INDUSTRY DEPENDS ON COOPER-BESSEMERS

In California, over 90% of the compressor units in the entire natural-gas industry are of Cooper-Bessemer make. Seventeen California compressor stations, with a combined total of over 53,000 Cooper-Bessemer H.P., are maintaining high standards of public service.

Ask a Cooper-Bessemer representative about the new Type-12 — built to last a lifetime.

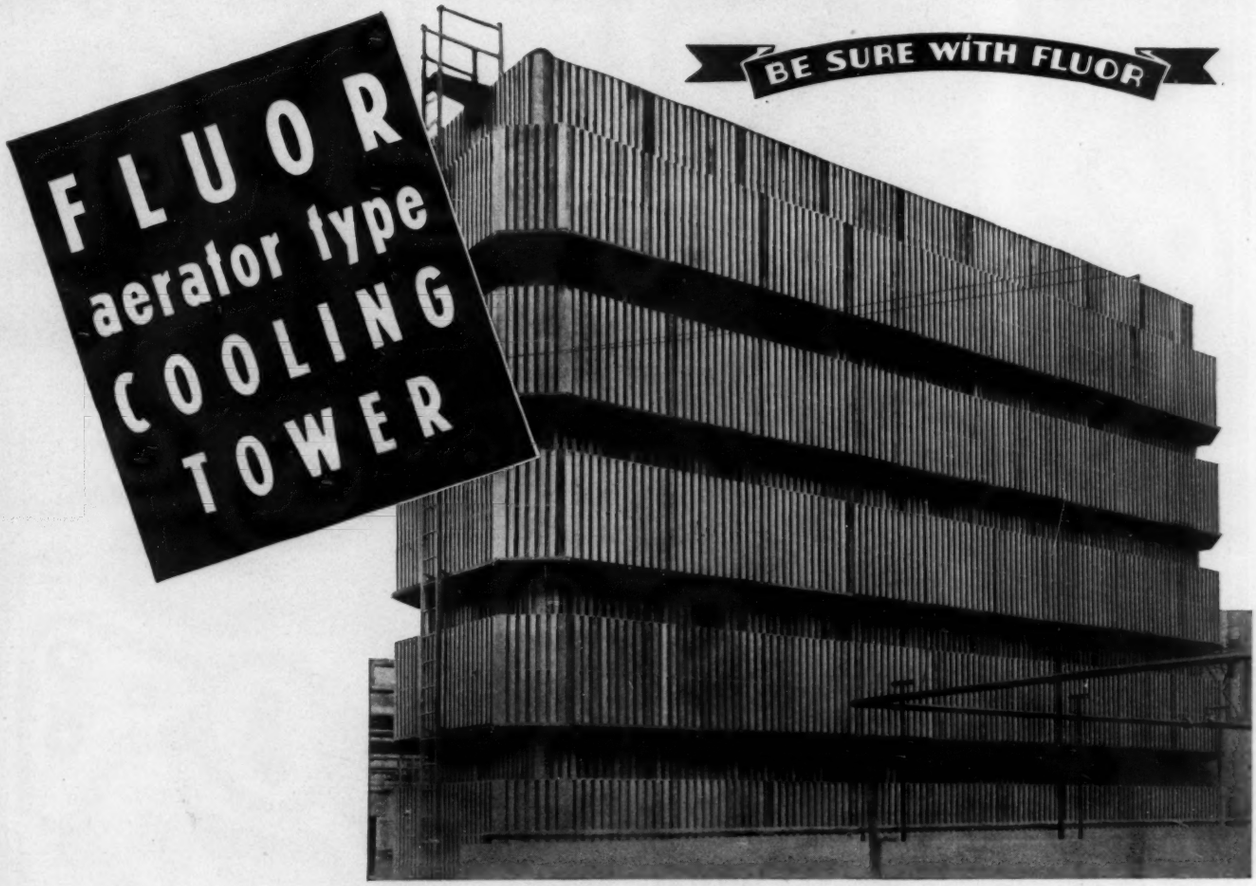
1. The Inglewood station of Southern California Gas Company, with eleven 170 H.P. Type-80 compressor units.
2. Industrial Fuel Supply Company's Seal Beach Station, with six 200 H.P. Type-10 compressor units.
3. Five 760 H.P. Type-19 compressor units in the Pacific Gas and Electric Company's Kettleman Hills Station.
4. The Taft station of the Southern California Gas Company, with six 21½x42 Cooper-Bessemer compressor units, totalling 6000 H.P.
5. Ventura Fuel Company's gas compressor station near Ventura. The largest compressor station on the west coast, it contains ten 760 H.P. Type-19 compressor units.

THE COOPER-BESSEMER CORPORATION

Mt. Vernon, Ohio — PLANTS — Grove City, Pennsylvania

25 West 43rd St. New York City — Mills Bldg. Washington, D. C. — 640 E. 61st St. Los Angeles, Calif. — Esperson Bldg. Houston, Texas — Magnolia Bldg. Dallas, Texas — 225 Crockett St. Shreveport, La. — 201 E. First St. Tulsa, Oklahoma

Full cooling Performance under all conditions

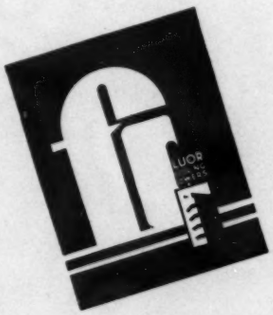


In every major oil field, oil refinery or gas plant, Fluor Aerator Type Cooling Towers are living up to their reputation—"efficiency under all operating and weather conditions."

Primarily, their nationwide acceptance is due to these factors: Positive elimination of wind-blown spray; ease of installation where space is at a premium; assurance of full cooling performance under all conditions; sturdy, sound construction; and the effecting of considerable savings in preventing water losses, as well as in protection of nearby equipment from corrosive action of wind-blown spray.

Fluor Aerator Type Cooling Towers are engineered and erected by an organization known for its perfection of workmanship, for its field experience and for its specialized engineering knowledge. Aerators are easily and economically applied to existing towers of louvre type construction. Fluor Aerators will actually save on the average of from one per cent to two per cent of the water circulation on makeup requirements.

The Fluor Corporation, in addition to manufacturing cooling towers, design, construct and install plants and plant equipment in entirety or in part, for the entire oil and gas industries.



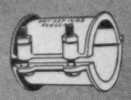
"Fluor AERATOR-TYPE Cooling Towers" is the title of this Bulletin explaining details of design and construction. Your request for copies will receive prompt attention.

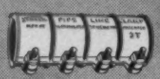
FLUOR CORPORATION
•LTD•

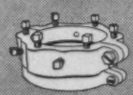
909 East 59th St., Los Angeles, Calif.

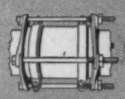
909 McCormick Bldg. Chicago, Ill.
1406 Esperson Bldg. Houston, Texas
2342 State St. Alton, Ill.
719 McBirney Bldg. Tulsa, Okla.
220 W. 42nd St. New York, N. Y.

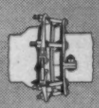
SKINNER

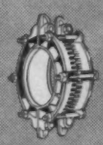

EMERGENCY PIPE CLAMP

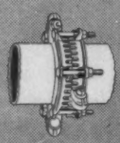

PIPE LINE CLAMP


PIPE JOINT CLAMP

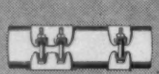

COLLAR LEAK CLAMP


BELL JOINT CLAMP


SPLIT COUPLING CLAMP

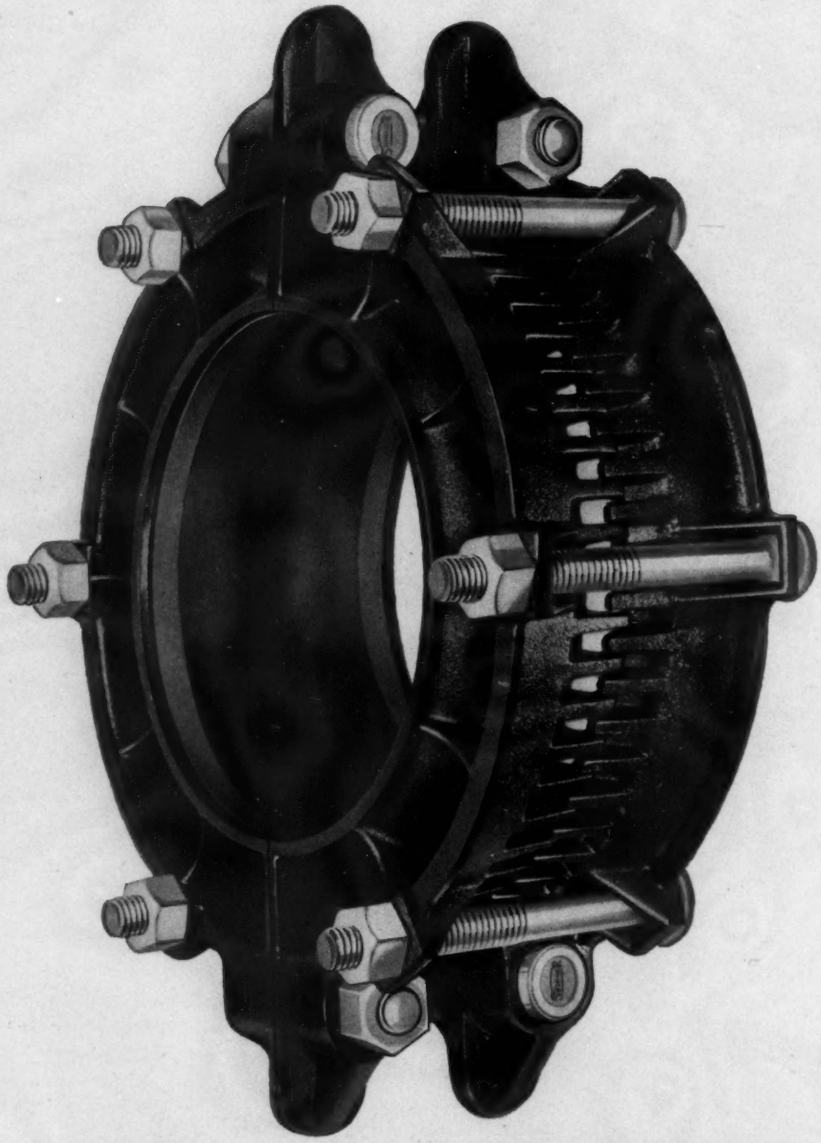

HIGH PRESSURE WELD CLAMP

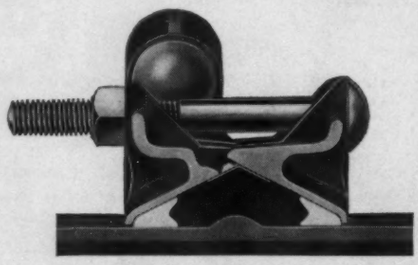
SERVICE SADDLE


PRESSED STEEL ECONOMY CLAMP

A CLAMP FOR EVERY LEAK

HIGH PRESSURE WELD CLAMP





A TWO-PURPOSE CLAMP

(1) For repairing pinholed, cracked or ruptured welds, (2) for replacing leaky mechanical couplings. Gasket SEALED by Monel metal band. Absolutely permanent — low cost. Instant one-man application, without interrupting service. Write for prices and complete catalog.

M. B. SKINNER COMPANY

Manufacturers and Engineers • Est. 1898

SOUTH BEND • • INDIANA

J-M TRANSITE FLUE PIPE

is non-corrodible, weather-proof, permanent . . . and Surprisingly Inexpensive

Heat in its most convenient form. That's what you're selling. To square your performance with your promise, you've got to provide appliances and equipment that are thoroughly dependable, virtually trouble-proof and maintenance-free.

So far as one important item of equipment is concerned, your troubles are over. The repair and replacement of corroded flue pipes is a thing of the past. J-M Transite Flue Pipe outlasts the gas furnace itself.

In to Stay

Transite Flue Pipe, made of asbestos fibre and Portland cement, is remarkably resistant to corrosive fumes and condensates. It is permanent. Absolutely weatherproof. On either indoor or outdoor jobs, you install it and forget it.

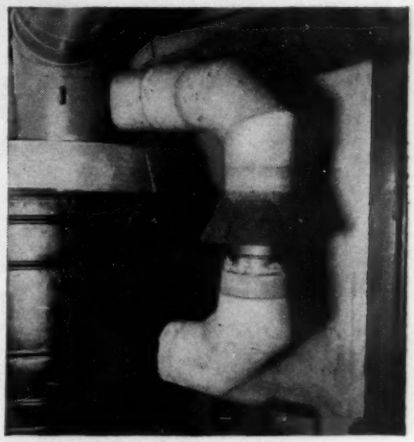
Because of its relatively low heat conductivity, Transite Flue Pipe keeps stack temperatures at a high level for longer distances, minimizing condensation in the flue. And, like all asbestos products, it is unusually resistant to high temperatures.

It is supplied in both round and oval form, in various capacities. And a full line of fittings is available.

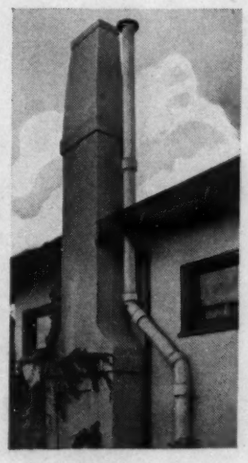
Cost, considering its obvious superiority, is surprisingly low. Installation, quick and easy.

And it's approved by the Underwriters Laboratories, Inc.

Specifications and complete information in regard to installation methods are included in our new brochure. Let us mail you a copy. Use the coupon.



■ **Rear view of gas-fired furnace vented by J-M Transite Flue Pipe. (Front view shown in photograph at top of page.) Transite Flue Pipe is quickly and easily installed; a full line of fittings is available.**



■ **Absolutely weatherproof (it's made of asbestos fibre and Portland cement) J-M Transite Flue Pipe has solved the venting problem in thousands of Pacific Coast homes where flue pipe must be installed outdoors.**

Johns-Manville

TRANSITE FLUE PIPE

JOHNS-MANVILLE, 22 East 40th Street, New York City
Send me a copy of the Transite Flue Pipe brochure.

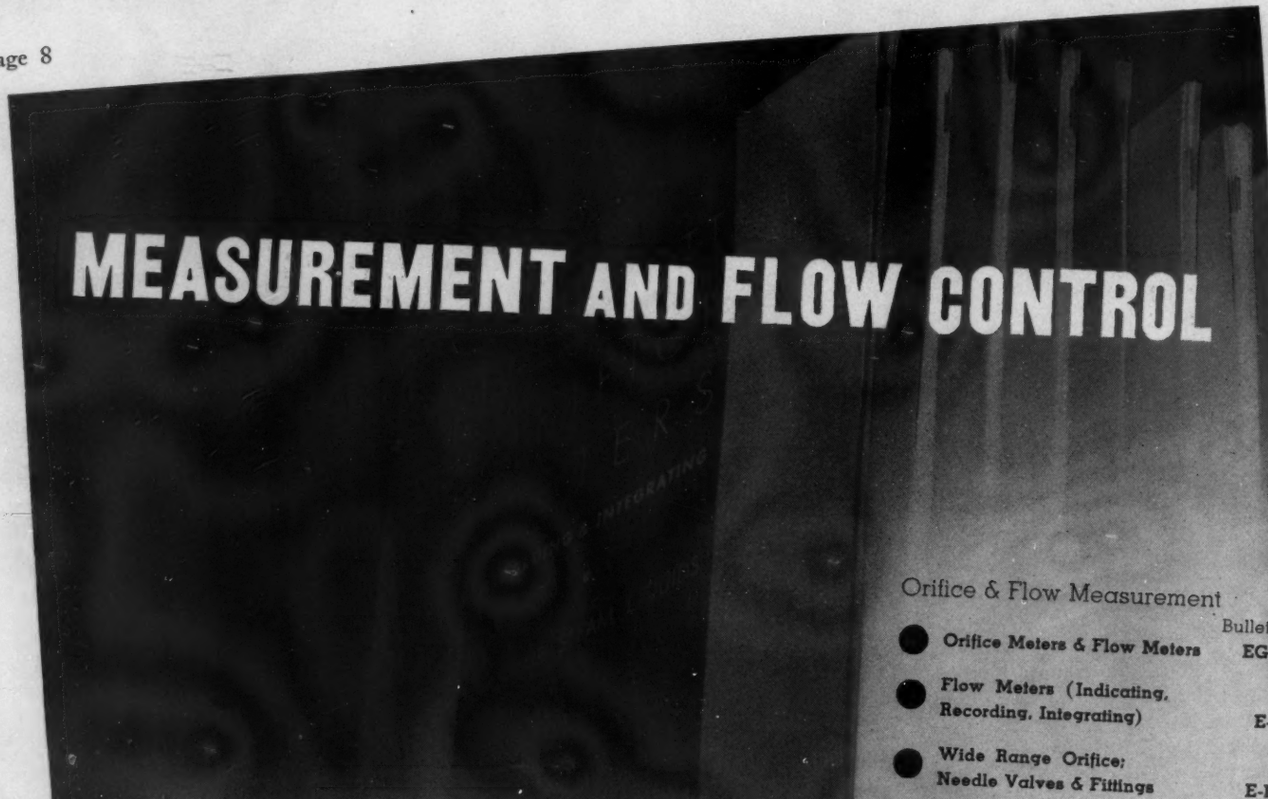
Name_____

Address_____

City_____ State_____

WG-8-35

MEASUREMENT AND FLOW CONTROL



fifteen new engineering bulletins

They give you the information you will want today for keeping abreast of modern developments in the measurement and control of gases, steam and liquids . . . they provide in convenient form the tables, diagrams and data you will want for reference tomorrow.

Please write for any bulletins of interest which you have not received.

AMERICAN METER COMPANY
INCORPORATED
Measurement and control of Gas, Oil, Steam, Air and Liquids
ESTABLISHED 1836

GENERAL OFFICES: 60 EAST 42nd STREET, NEW YORK, N. Y.

320

Orifice & Flow Measurement

	Bulletin
Orifice Meters & Flow Meters	EG-2
Flow Meters (Indicating, Recording, Integrating)	E-3
Wide Range Orifice; Needle Valves & Fittings	E-15

Controllers

Liquid Level; Rate-Volume; Proportional; Remote	E-5

Displacement Measurement—Gas

Ironcase Meters	EG-40
Base Pressure Index; Base Volume Index	E-12
Volume & Pressure Gages	E-6
Demand Meters (Recording & Indicating)	AG-4

Gas & Air Regulators

Complete line of bulletins	

Proving & Testing Apparatus

Flow Provers (Orifice)	E-8
Gravitometer (Specific Gravity Recorder)	E-21
Meter Proving & Testing Apparatus (Displacement)	AG-1
Laboratory Gas Testing Apparatus	AG-2
Wet & Dry Test Meters	AG-3
Pressure Gages & Thermometers	AG-5
Service Cleaners; Drip Pumps	AG-6

August, 1935

WESTERN GAS

"Reg.U. S. Pat. Off."

Vol. XI, No. 8

LOS ANGELES—810 South Spring Street . . . . . 1064 Peoples Gas Building—CHICAGO

Recent Developments in the Use of

Copper Pipe for Gas Distribution

By F. A. HOUGH

Distribution Engineer, Southern Counties Gas Company of California*

INTEREST in the use of copper pipe in gas distributing systems is now being displayed by a number of gas companies operating in areas where corrosive soils are encountered.

The Union Gas and Electric Co.'s use of copper tubes for gas services in Cincinnati has recently been described in an article by E. A. Munyan.[1] During 1934, copper gas services were installed on an experimental basis by the Detroit City Gas Co., and by the Equitable Gas Co. in Pittsburgh. The Houston Gas & Fuel Co., the San Antonio Public Service Co., the Pacific Gas and Electric Co., the Los Angeles Gas and Electric Corp., and the Southern California Gas Co. have been investigating the use of copper pipe within the past year.

F. A. Hough

The recent installation of a 2-inch copper gas line from the Continental Oil Field to Ship Rock, New Mexico, a distance of about 7 miles, is an interesting example of the use of copper pipe to solve a difficult soil corrosion problem. This line was built by the United States Government and operates at 150 lbs. per sq. in. pressure.

Nearly all water companies operating in California use some copper tubing for water services and in some cases, notably in the cities of Los Angeles, Oakland, San Diego, Santa Barbara, and Ventura, copper tubing is used extensively for that purpose.

Copper pipe has been used by the Southern Counties Gas Co. of California since 1926. Its copper installations as of June 30, 1935, are indicated in Table No. 1.

A. F. Bridge and the writer presented a paper at the A.G.A. Distribution Conference in Birmingham, Ala., in April 1932, reporting the results of the Southern Counties Gas Co.'s investigation of copper pipe.[2]

The purpose of the present report is to discuss the conclusions of the earlier paper in the light of our experience since its publication, and to present new information developed since the publication of the 1932 paper, concerning both the corrosion resisting properties of copper pipe and construction methods for the use of that pipe. Cost data obtained from recent installations and a discussion of the engineering economy involved in the use of copper pipe under present conditions are also included in this paper.

*Presented before the annual Southern California Corrosion Conference, held at Los Angeles, July 23, 1935, under the auspices of the Pacific Coast Gas Association's Pipe Protection Committee.

(1) Development in the Use of Copper Tubing for Gas Services. E. A. Munyan. Gas Age-Record, Vol. 76, N. 3, January 19, 1935.

(2) Copper Pipe for Gas Distribution. Arthur F. Bridge and Frederic A. Hough. Gas Age-Record. April 23, 1932, pp. 503, 513. American Gas Journal, May 1932, pp. 48-49.

Review of Previous Paper

The 1932 paper presented evidence concerning the corrosion resisting properties of copper and copper bearing alloys when exposed to corrosive soils and when exposed to corrosive gases sometimes found in natural or manufactured gas.

The soil corrosion evidence was taken from publications of the Bureau of Standards and also from laboratory and field tests made by the authors' company.

Evidence concerning the corrosive effect of hydrogen sulphide, carbon dioxide, oxygen, water vapor, hydrocyanic acid gas and various mixtures of these

TABLE NO. 1. COPPER PIPE IN USE BY SOUTHERN COUNTIES GAS CO. (JUNE 30, 1935).

	Total Length (Feet)		Installed Cost (Dollars)
10,686 Services		255,518	$247,568.21*
Mains—1½-in. and smaller	7,862		
2-in.	252,838		
3-in.	39,960	300,660	292,456.13
TOTAL		556,178	$540,024.34

* This cost includes the cost of curb-meter boxes. Services run from main to property line only. Average length of service is 24 feet.

TABLE NO. 2. RESULTS OF LABORATORY ACCELERATED CORROSION TESTS MADE TO DETERMINE THE EFFECT OF IRON OXIDE ON THE CORROSION OF COPPER IN SOIL.

Sample Number	Kind of Sample	Soil Conditions Used	Loss in Weight	Surface Sq. Cms.	Loss Gms. per Sq. Cm. x 10^4	Avg. Loss	REMARKS
29	Steel	Soil	0.0738	41.7	17.70		
30	Steel	Soil	0.0675	41.7	16.20	17.71	Uniform honeycomb corrosion.
31	Steel	Soil	0.0766	41.7	18.37		
32	Steel	Soil	0.0774	41.7	18.57		
25	Copper	Soil	0.0161	41.7	3.86		
26	Copper	Soil	0.0073	41.7	1.75	3.79	Samples 25 and 27 are nearly covered with a black tarnish. No. 28 is about ½ covered with tarnish. No. 26 is only tarnished around the edges.
27	Copper	Soil	0.0157	41.7	3.77		
28	Copper	Soil	0.0242	41.7	5.81		
5	Copper in contact with steel	Soil and rust mixture	0.0027	53.3	0.51		Heavy black tarnish covers surface on both sides. Steel Surrounding No. 8 very badly corroded and rusted.
6			0.0071	53.3	1.33		
7			0.0061	53.3	1.15	3.06	
8			0.0494	53.3	9.26		
21	Copper	Soil and rust	0.0063	41.7	1.51		No. 21 and No. 23 are ¼ covered with a purple scale. Rest of surface only tarnished slightly. No. 22 and No. 24 are completely covered with the purple and green scale.
22	Copper		0.0739	41.7	17.73		
23	Copper		0.0325	41.7	7.80	11.85	
24	Copper		0.0849	41.7	20.37		
17	Steel	Soil and rust	2.9797	41.7	717.0		Pitted and deeply corroded over entire surface.
18	Steel		2.5650	41.7	618.0	667.5	

gases and also the corrosive effect of drip oil taken from natural and manufactured gas distributing systems was obtained from tests run in the Southern Counties Gas Co.'s laboratory and from field tests made by installing short sections of copper pipe in the distribution systems of the San Diego Consolidated Gas and Electric Co. and the Pacific Gas and Electric Co. Both of these companies were distributing oil gas at the time.

The earlier paper also described construction methods in use at the time of its publication and presented a study of the engineering economy of the use of copper pipe.

The conclusions drawn in that paper, which still appear to be valid, are as follows:

1. In many corrosive soils the rate of corrosion of copper is less than that of steel by an amount sufficient to justify its use for gas services and for 2- and 3-inch mains, provided internal corrosion is not a limiting factor.

3. Copper pipe is probably unsuited for underground pipe in areas where stray current electrolysis is severe.

4. Copper pipe should not be used to distribute gas containing as much as one grain of hydrogen sulphide per 100 cubic feet, unless the gas is dry.

5. Undehydrated oil gas as ordinarily purified will corrode copper pipe.

6. The corrosion of copper pipe by purified but undehydrated oil gas, is more rapid than that due to many corrosive soils.

7. Dehydration greatly reduces the rate at which the corrosive gases, normally present in purified manufactured gas, attack copper.

8. From the standpoint of both mechanical strength and soil corrosion resistance, a wall thickness of .065 inch (No. 16 gauge) is sufficient for copper gas mains and services 3 inches in diameter and smaller.

11. When a reduction in pipe size is permissible, it is practical and economical to replace old mains and services by using them for conduits for copper pipe, thus avoiding much cutting of pavement and lawns.

12. Because of the low cost of installation, the use of copper pipe inside existing steel mains and services is fully justified, regardless of the rate at which the soil attacks steel.

Conclusion No. 2 of the original report, concerning the corrosion resistance of copper alloys, conclusion No. 10, concerning the use of solder fittings, and conclusions No. 13 and No. 14, concerning the economy of the use of copper pipe, should all now be modified, as this paper will show.

TABLE NO. 3. PIPE COST IN DOLLARS PER FOOT DELIVERED TO JOB.

Nominal Diameter	¾ in.	1 in.	1¼ in.	2 in.	3 in.	4-in.
Steel (Standard weight. No coating)	.057	.081	.108	.191	.368	.487
Copper*	.127	.162	.200	.350	.535	.....
Cast Iron (Mechanical Joint, 250 lbs. W.P. 16 ft. lengths)	.....	.....	.....	.320	.526	.630

* Copper tubing 17 Stubbs gauge sizes ¾ in., 1 in. and 1¼ in. 16 Stubbs gauge sizes 2 in. and 3 in.

New Evidence

The best evidence concerning the ability of copper pipe to withstand soil corrosion that we can now add to that presented in the 1932 paper is the results of our actual experience with the copper pipe now in our distribution systems. We now have over 100 miles of copper pipe installed in almost every type of corrosive soil to be found in Southern California, including adobe, alkali bottoms, salt marshes, and submarine crossings. These copper lines are connected at innumerable points to steel or cast iron lines. Some of this copper has now been in the ground for nearly 9 years in soils where our previous experience has shown that 2-inch steel pipe protected with a hot asphalt coating without wrapper will last considerably less than 9 years. We have yet to find a case where an appreciable loss of copper metal has occurred. And what is just as important, we have yet to find any evidence that the use of copper pipe has resulted in the accelerated corrosion of

the steel or cast iron lines to which copper has been connected. These observations are based for the most part on the inspection of short lengths of copper pipe exposed during construction work. However, on a few occasions it has been necessary to remove several hundred feet of copper pipe for reasons other than corrosion. These cases have provided excellent opportunities to study the condition of copper lines that have been exposed to corrosive soils.

A 3-inch copper submarine line across Newport Harbor is a notable instance of this type. This was a bare copper line 988 feet long, installed in January, 1928, in a dredged trench at the bottom of the harbor. The lengths were joined with Tobin bronze brazed butt joints, and at each end of the crossing a brazed connection was made to a steel distribution system. No insulating joints were used. It was necessary to remove this line in December, 1933, because of dredging operations in the harbor. Upon removal, the pipe, including the Tobin bronze collars and the sections of pipe at the shore line which were alternately submerged and exposed by the tides, was found in perfect condition.

During the discussion of the copper pipe paper at the A.G.A. Distribution Conference in 1932, F. G. Smith, metallurgist, American Brass Co., expressed apprehension concerning the practice of installing copper pipe inside of old steel mains and services as was recommended in the 1932 paper. He stated that copper condenser tubes have been found to corrode rapidly at points where they come in contact with iron and steel corrosion products and that in general the presence of iron salts tends to increase the rate of corrosion of copper.

As a result of this comment accelerated laboratory tests were run in the Southern Counties Gas Co.'s laboratory, with the following results:

When copper samples were buried in a mixture consisting of 75 per cent corrosive soil and 25 per cent iron oxide, the average loss of weight was approximately three times as great as when copper samples were buried in the same soil to which no iron oxide had been added. However, when copper samples were connected electrically to steel samples and both were buried in a mixture of 75 per cent soil and 25 per cent iron oxide, the loss of weight of copper was in some cases, but not in all, about the same as when buried in soil containing no added iron oxide. None of the copper samples used in these tests lost anywhere near as much weight per unit area as did steel samples exposed to the 75 per cent soil and 25 per cent iron oxide mixture.

The results of these tests are summarized in Table No. 2. For details concerning the manner in which accelerated soil corrosion tests on copper are conducted in our laboratories, see the 1932 report.

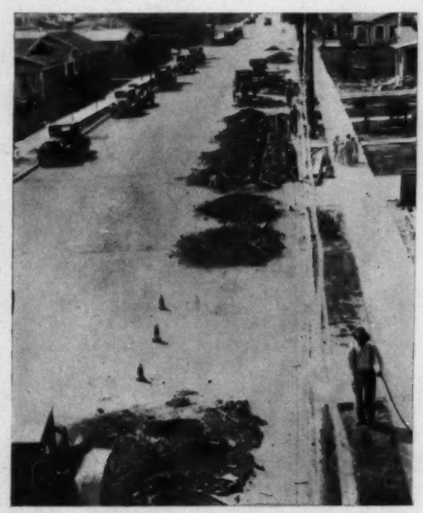
Numerous field inspections of copper pipes that have been installed inside of old steel pipes for several years have failed to disclose a case where appreciable corrosion of the copper has occurred. We have therefore concluded that the accelerating effect of iron oxide on the corrosion of copper by a soil is not serious enough under our field conditions to warrant the discontinuance of the practice of using old steel pipes for conduits in cases where savings in installation cost are effected by such use.

When copper and steel are submerged in an electrolyte, a galvanic potential difference of approximately .77 volts exists between the two, the steel being the more positive. It is therefore evident that when steel and copper are connected underground a galvanic cell is set up which tends to accelerate the corrosion of the steel. This fact has deterred some companies in the use of copper pipe. However, a single isolated fact of this type does not permit the drawing of valid conclusions concerning so complex a phenomenon as soil corrosion. Apparently in actual practice other factors such as polarization and the electrical resistance of the soil, and the existence of other potential differences of equal or greater magnitude such as those produced by differences in oxygen concentration or moisture content, tend to reduce the effect of the potential difference between copper and steel so that it is not the factor that determines the life of the steel and therefore it is of negligible importance.

This dissimilar metal problem was treated at some length in the 1932 paper. The conclusion drawn in that paper was that if certain simple precautions are taken to prevent concentrated corrosion, which occasionally occurs when the area of the ferrous metal is small compared with the area of the copper, no ill effects result from the use of copper in a system consisting predominantly of steel or cast iron pipe. This conclusion is based on the field observations of a trained observer sent out to look for trouble from this source.

The precautions we observe are these: We do not use steel, cast iron, or wrought iron fittings in copper lines and we protect all joints between copper and ferrous metals with a protective coating such as hot asphalt or coal-tar. This protection is extended for a distance of 2 or 3 feet from the junction along both the copper and steel lines.

(Continued on Page 26)



LEFT: Showing pavement cuts required to install 400 feet of 2-inch copper main inside of old 3-inch steel main (San Pedro, Calif.). Other views show assembled copper main entering old steel main.

25 METHODS for Developing Sales Leads

By W. C. MAINWARING

Merchandise Manager, British Columbia Electric Railway Co., Ltd., Vancouver, B. C.

HALF THE BATTLE in making salesmen's efforts productive is giving them definite sales leads, instead of relying on cold canvassing. A most complete system for getting those leads, successfully used by B. C. Electric Railway Co., Ltd., Vancouver, B. C., is described below in a paper before the Northwest Conference of the Pacific Coast Gas Association, held last month at Tacoma, Wash.—*Editor.*

IN STUDYING the problem of building up a real high type of personnel in our sales department we came to the conclusion that two things were necessary; first, a plan of compensation that would allow our salesmen to live comfortably, and second, some method of providing the salesmen with an abundance of prospects and eliminating as far as possible cold canvassing. It is not my mission here to deal with compensation plans but to deal only with the question of prospects or developing sales leads.

Anyone who has ever done house-to-house canvassing knows there is nothing more discouraging than to tramp along hour after hour, particularly in cold wet weather, trying to secure prospects that might be interested in some type of appliance. Our experience during recent years has proven that if the problem of securing leads is properly organized and supervised it is possible to supply any number of salesmen with a sufficient number of leads when they leave the office each morning to keep them occupied all day and prevent them from feeling at all discouraged. We have gradually developed from 20 to 25 methods of securing leads that enable our salesmen to make contacts, having in mind a definite purpose before the contact is made, and I will deal with these individually.

1st Method—Prospects secured by inside clerks in salesrooms:

This should be one of the most profitable methods of securing sales leads because the sales clerk has had an opportunity of demonstrating an appliance to a customer and the customer is therefore familiar with it before the salesman calls. Although the sales clerk is paid for this particular purpose, we have found that a little competition among the inside salespeople stimulates the number of prospects secured to a great extent and we award what we call 'prospect points' to each inside sales person for each prospect he arranges a demonstration or timed appointment for, and these are shown on the back of prospect form No. M-1724. (See Fig. 1) A monthly record is kept of the prospect points earned by all sales clerks and there are valuable prizes awarded to those clerks turning in the largest number in each salesroom. Another form is used for keeping an annual record. We have a register form to keep a weekly record of these points and these are transferred at the end of each month to the annual record sheet just referred to.

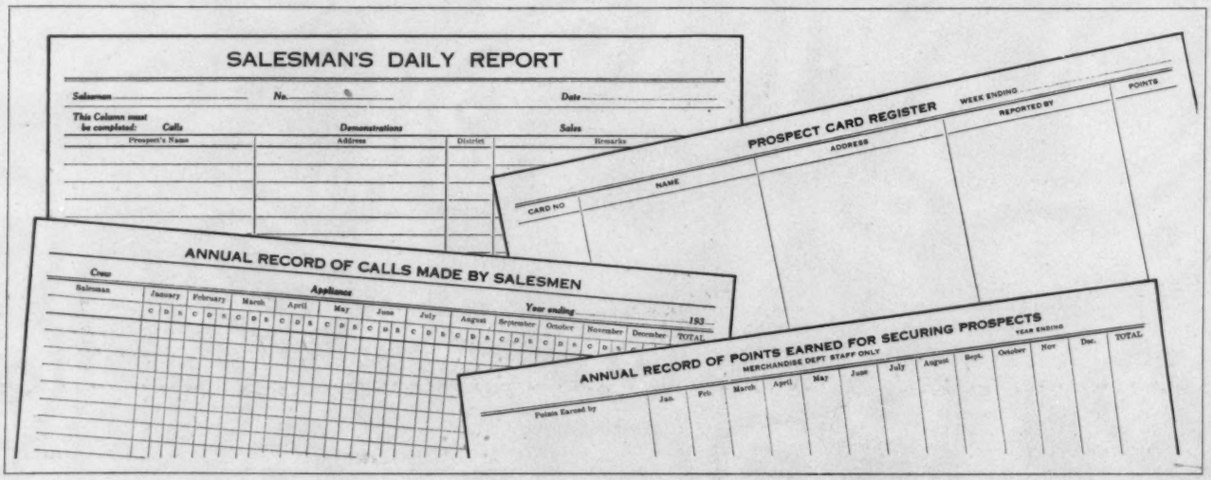
This system may appear to be elaborate, but it is actually so simple in operation that with 80,000 customers to follow and some 50 outside salesmen handling both gas and electric appliances, one clerk is all that is needed to keep the complete record system up-to-date. It would take several more salesmen to secure the additional business that we secure each month from this system.

2nd Method—Contacts made by outside salesmen for appliances other than those they are directly interested in selling:

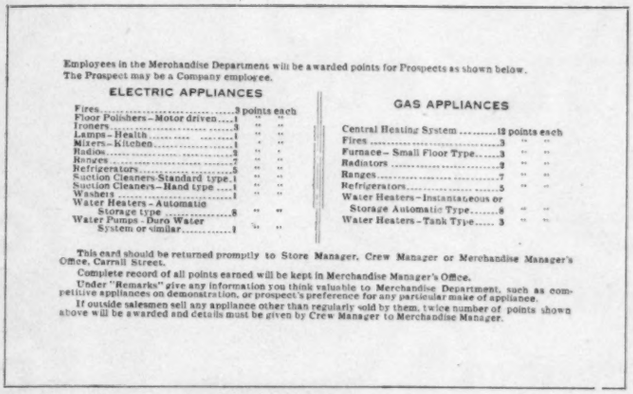
To encourage our salesmen selling, as an example, washing machines, we allow 'prospect points' as shown on card No. M-1724 (Fig. 1), and prizes are given each year for the salesmen in each division earning the largest number of prospect points.

3rd Method—Prospects received from telephone inquiries:

We have a small form No. 1737 (See Fig. 2) that is used for many purposes. When a customer telephones in for in-


SALESMAN'S DAILY REPORT
PROSPECT CARD REGISTER
ANNUAL RECORD OF CALLS MADE BY SALESMEN
ANNUAL RECORD OF POINTS EARNED FOR SECURING PROSPECTS

Several of the sales forms used by B. C. Electric in recording prospect points and salesmen's calls.



Employees in the Merchandise Department will be awarded points for Prospects as shown below. The Prospect may be a Company employee.

ELECTRIC APPLIANCES

Fires	3 points each
Floor Polishers–Motor drives	1 " "
Ironers	3 " "
Lamps–Health	1 " "
Mixers–Kitchen	1 " "
Radios	5 " "
Ranges	7 " "
Refrigerators	5 " "
Suction Cleaners–Standard type	1 " "
Suction Cleaners–Hand type	1 " "
Washers	1 " "
Water Heaters–Automatic Storage type	6 " "
Water Pumps–Duro Water System or similar	1 " "

GAS APPLIANCES

Central Heating System	12 points each
Fires	3 " "
Furnace–Small Floor Type	3 " "
Radiators	2 " "
Ranges	7 " "
Refrigerators	5 " "
Water Heaters–Instantaneous or Storage Automatic Type	6 " "
Water Heaters–Tank Type	3 " "

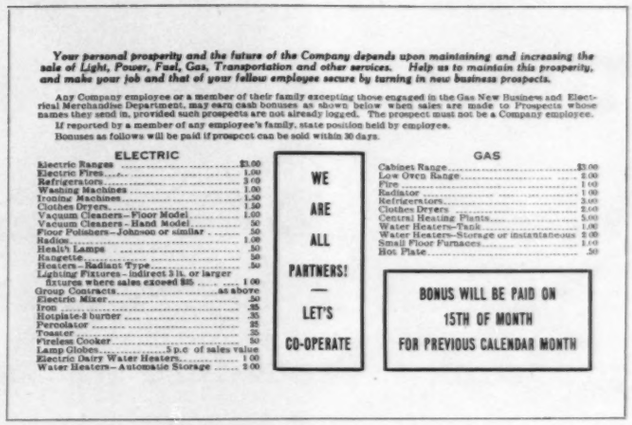
This card should be returned promptly to Store Manager, Crew Manager or Merchandise Manager's Office, Carrall Street.

Complete record of all points earned will be kept in Merchandise Manager's Office.

Under "Remarks" give any information you think valuable to Merchandise Department, such as competitive appliances on demonstration, or prospect's preference for any particular make of appliance.

If outside salesmen sell any appliance other than regularly sold by them, twice number of points shown above will be awarded and details must be given by Crew Manager to Merchandise Manager.

FIG. 1. (Reverse side of Form No. 1724.)
On the front sides of Fig. 1 and Fig. 3 are forms calling for sales prospect information.



Your personal prosperity and the future of the Company depends upon maintaining and increasing the sale of Light, Power, Fuel, Gas, Transportation and other services. Help us to maintain this prosperity, and make your job and that of your fellow employee secure by turning in new business prospects.

Any Company employee or a member of their family excepting those engaged in the Gas New Business and Electrical Merchandise Department, may earn cash bonuses as shown below when sales are made to Prospects whose names they send in, provided such prospects are not already logged. The prospect must not be a Company employee.

If reported by a member of any employee's family, state position held by employee.

Bonuses as follows will be paid if prospect can be sold within 30 days.

ELECTRIC

Electric Ranges	$3.00
Electric Fires	1.00
Refrigerators	3.00
Washing Machines	1.00
Ironing Machines	1.50
Clothes Dryers	1.50
Vacuum Cleaners–Floor Model	1.00
Vacuum Cleaners–Hand Model	.50
Floor Polishers–Johnson or similar	.50
Radios	1.00
Health Lamps	.50
Hangette	.50
Heaters–Radiant Type	.50
Lighting Fixtures–Indirect 3 lt. or larger fixtures where sales exceed $25	1.00
Group Contracts	as above
Electric Mixer	.50
Iron	.25
Hotplate-2 burner	.35
Percolator	.25
Toaster	.25
Wireless Cooker	.50
Lamp Globes	5 p.c of sales value
Electric Dairy Water Heaters	1.00
Water Heaters–Automatic Storage	2.00

WE ARE ALL PARTNERS! — LET'S CO-OPERATE

GAS

Cabinet Range	$3.00
Low Oven Range	2.00
Fire	1.00
Radiator	1.00
Refrigerators	3.00
Clothes Dryers	2.00
Central Heating Plants	5.00
Water Heaters–Tank	1.00
Water Heaters–Storage or instantaneous	2.00
Small Floor Furnaces	1.00
Hot Plate	.50

BONUS WILL BE PAID ON 15TH OF MONTH FOR PREVIOUS CALENDAR MONTH

FIG. 3. (Reverse side of Form No. 1725.)

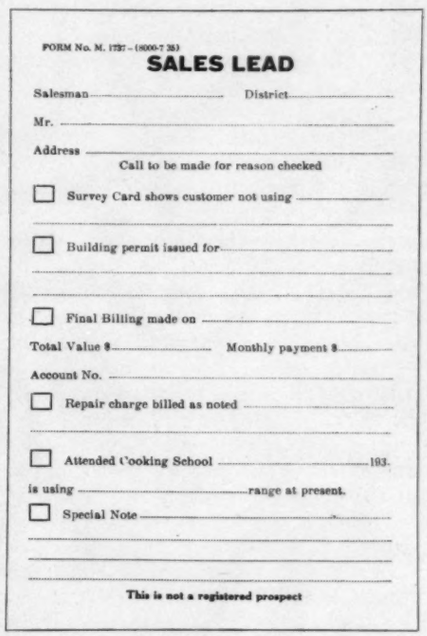
formation of any kind regarding any appliance or for information regarding the use of an appliance he now possesses we make a note of same on this small form, giving particulars of the inquiry, and it is given to the salesman in that district to follow up to make sure that the customer received a satisfactory answer to whatever the inquiry might have been. This establishes a contact for the salesman so that he gets into the home and has an opportunity of discussing other appliances and other services with the customer.

4th Method—This is referred to as "Using the user:"

Whenever a sale is made of a major appliance we place a card in our follow-up file with three dates on it. The first date is usually 10 days from the time the appliance is installed, the second one 10 days later, and the third approximately a month from the original purchase. On the first call the salesman mentions that he has dropped in to see whether the customer thoroughly understands the appliance and whether it is entirely satisfactory. The second call is along similar lines but the salesman asks just what the purchaser's friends or relatives think about the appliance. The third call is definitely to secure the name or names of people who have seen the appliance that might be interested in purchasing something of a similar nature. This is one of our most productive methods of securing new leads.

5th Method—From prospects turned in by employees of other departments than the sales department:

We have an employee co-operative scheme and during the month of May we received at the Vancouver office 500 prospects from our employees. Approximately 100 of these were converted into sales. We have a special prospect card No. 1725, which makes it very



FORM No. M. 1737–(8000-7 35)

SALES LEAD

Salesman ..... District .....

Mr. .....

Address .....

Call to be made for reason checked

☐ Survey Card shows customer not using .....

☐ Building permit issued for .....

☐ Final Billing made on .....

Total Value $ ..... Monthly payment $ .....

Account No. .....

☐ Repair charge billed as noted .....

☐ Attended Cooking School ..... 193.

is using ..... range at present.

☐ Special Note .....

This is not a registered prospect

FIG. 2. (Form No. 1737.)

simple for the employee to give us sufficient information to place in the hands of the proper salesmen, and on the reverse side of the card (See Fig. 3) are shown the bonuses we pay if these prospects are sold. This card is a different color to the one used by employees of the merchandise department because in the case of merchandise department employees we only give prospect points, but in the case of our employees at large we pay cash bonuses. When these two cards, that is, No. M-1724 and No. 1725, are received by the prospect clerk the information is immediately transferred to card No. 1726 (See Fig. 4) which goes to the salesman through his supervisor, and the district and other information is put on by the prospect clerk for means of quick identification later. We insist on having a report on these prospects within 24 hours, and, having a prospect clerk whose duty it is to follow these things up removes the responsibility from the sales supervisors because we do not like to add any more clerical work to their duties than is absolutely necessary. We also have two cards, one for advising the person sending in a prospect that this particular prospect has already been filed with someone else, and the other to advise the person sending in the prospect just exactly what the report of the salesman's call is. These maintain interest on the part of the individual sending in the prospect.

6th Method—Appliances to consumers who are being billed with the final payment on previous time payment purchases:

When our billing department transfers the last payment on an appliance to the customer's bill this bill is sent to the merchandise department before it is mailed out so that we can copy on the small form No. 1737 (Fig. 2) information for the salesmen to the effect that final billing has been made on a particular appliance of a total value of, say, $100, with monthly payments of $10, and the customer's account number is given. The salesman immediately contacts this customer and endeavors to sell him another appliance, pointing out that he can carry on as in the past with small monthly payments. Approximately 25 per cent of our customers are sold something else from these follow-ups.

7th Method—is a contact made where we have made an appliance repair:

Each day the service department notifies us of all service charges and whether it be an iron plug, toaster, vacuum cleaner, or range repair, we make a note on form No. 1737, which shows that the repair as noted was made. The salesman calls and addresses the customer something like this: "Mrs. Jones, our serv-

(Continued on Page 22)

UNCLE SAM . . . FUEL BUYER

Prospective markets for gas and for appliances in the Federal building program + Procedure for selling them

By GEORGE W. BEAN

Fuel Consultant,
American Gas Association,
Albee Building, Washington, D. C.

AS this article is written Congress is in session, and the National Emergency Council which will allocate funds under the Public Works program is completing its organization and studying the merits of the many applications now on file by the various departments of government. No definite statement as to what projects for which funds will be allocated and the amount to be allocated can be made at this time, but a general idea can be given which should be of value to gas utility companies and manufacturers of appliances, as naturally both of these are vitally interested in this building program. If the utilities and manufacturers make note of the information contained herein and follow suggestions, the gas industry will reap the largest possible benefit. The Washington Office of the American Gas Association has maintained the closest possible contact with the various departments of government in order to keep the industry fully acquainted with the government's program.

Regular Appropriations

As yet Congress has not passed many of the large regular appropriation bills. These annual bills cover appropriations for the older departments of government and include monies for the purchase of equipment and fuel contracts. Many men in the gas industry are quite familiar with the manner in which this business is handled. The Deficiency Bill now before Congress carries a number of items for the completion of projects started last year and in addition thereto, the Treasury Department is asking for a lump sum for the construction of approximately 400 new buildings. This department builds all Custom Houses, Court Houses, Post Office buildings, and all buildings for the Public Health and Marine Hospital Service. The Procurement Division, Treasury Department, Federal Warehouse, Washington, D. C., handles all matters pertaining to fuel and equipment for new buildings. The Fourth Assistant Postmaster General, Maintenance Branch, Building Operations and Supplies, Post Office Department, Washington, D. C., handles renewal fuel contracts for Post Office buildings.

Gas companies may send full information relating to either of these subjects to the American Gas Association Washington office. However, if communication should be sent direct to either of the above government departments, carbon copies of such communication should be mailed to the Washington office in order that it may be in possession of all the facts on the subject. This same suggestion is made to both utilities and manufacturers in matters pertaining to all the other departments.

Most of the other regular departments of government have asked of Congress only an amount in their Appropriation Bills for their regular operation, and the building programs will be handled with funds allocated to them by the National Emergency Council under the 4 billion dollar appropriation for the Public Works program. These funds will be allocated for projects where the greatest possible amount can be expended for labor. In the programs outlined by the several departments for which funds have been requested a large percentage will be used for projects where fuel and appliances will be a large item.

The following is the best information available at this time. The War Department will probably ask for at least $150,000,000 to be expended for new buildings at army posts and for the purchase and installation of new machinery and appliances to replace worn out and obsolete equipment. Both gas company officials and manufacturers should keep in close contact with Construction Quartermasters at the different army posts where information will be obtainable when funds have been allocated and for what purpose they will be used.

The Navy Department will request an allocation of approximately $100,000,000 which will be used for a similar program as that of the War Department. The National Emergency Council already has appropriated more than 8 million dollars to the Navy Department for improvements and new equipment for the larger naval stations, including Mare Island, Puget Sound, New York, Boston and Philadelphia. Members of the industry should communicate freely with the Commandants of the several naval stations in order to keep advised as to the further allocation of funds and for what purpose.

The Department of Justice has not yet made a request for a definite amount, but will do so very shortly, as it has an extensive building program for new buildings and new equipment. It is our intention, as soon as a definite allocation of funds has been made, to pass the information on to the New York office of the American Gas Association for dissemination among industry members.

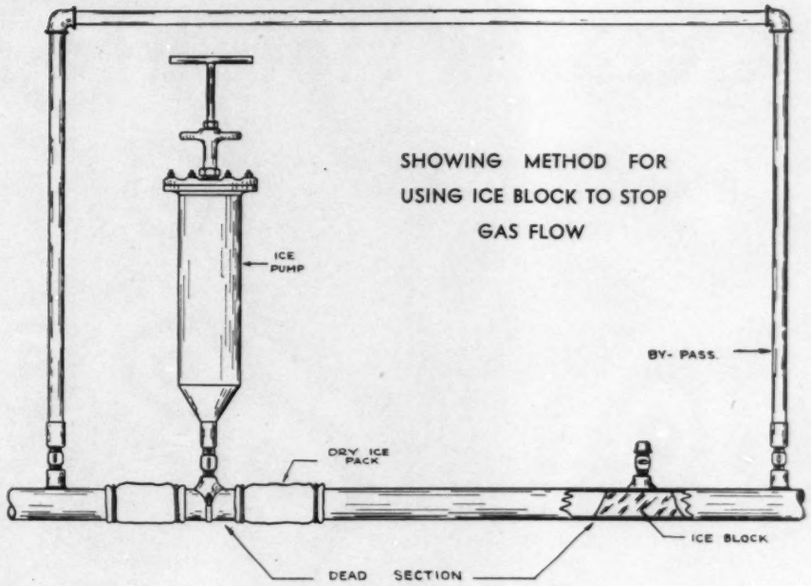
The Veterans Administration will probably request an allocation of funds in an amount exceeding $30,000,000. This fund will be utilized for new construction, reconditioning buildings and the purchase and installation of new equipment and appliances in the older buildings. Interested parties should communicate frequently with the officer in charge of the veterans facility in their territory in order to ascertain when appropriations are made. Our office will handle the Washington contacts.

The large amount of money the Bureau of Indian Affairs will ask for will

(Continued on Page 46)

By IRWIN H. WITT

Assistant Division Operating Foreman, Public Service Company of Northern Illinois



ICE Solves a Distribution Problem

A New Method of Stopping Flow of Gas Without Interrupting Service

SINCE the days when the distribution of gas to individual consumers through mains was first conceived, gas companies have been faced with the necessity of improving the service they render. Distribution system design met the problem of increasing customer saturation and complicated utilization equipment with improved construction materials, elaborate valving arrangements and with provision, wherever possible, of alternate sources of supply. In spite of the improved equipment, however, it was found impossible to eliminate interruptions to provide for both normal and emergency repairs and replacements, as well as to enable extensions for the purpose of expansion to be connected to existing systems. As the number of customers connected to the lines increased, interruptions also became increasingly undesirable, both from the customer's standpoint of convenience and safety and from the company's economic viewpoint.

The high pressure distribution system presented the more serious problem, for while it has long been possible to interrupt the flow of gas in a low pressure main between valves by the use of gas main bags and stoppers, until recently no satisfactory process for accomplishing this result had ever been developed to handle the case of the higher gas pressures. This article is devoted to the description of a method and the apparatus developed to accomplish this result. The new process has, in addition to its strictly high pressure applications, uses for low pressure work in those cases where conventional bagging is unsatisfactory because of the hazard of escaping gas, as in the case of confined quarters or building interiors.

The initial operation in stopping the flow of gas in a live main by the new method consists of clamping to the pipe at the point at which it is desired to shut off the flow a suitable pipe saddle containing a gas main cock and stuffing box above the cock. The main is next drilled and tapped, working through the stuffing box and cock, thus preventing any escape of gas.

The next operation requires the placing of a cold pack on each side of the saddle. The packs, made of canvas, containing either a cracked ice and salt mixture or preferably, dry ice (CO_2), are wrapped around the pipe and tied.

When the pipe is sufficiently chilled, a mixture of finely shaved ice and water is forced into the gas main from a specially constructed pump, the lower end of which is inserted into the main through the stuffing box and gas main cock. The shaved ice and water mixture is stored in the upper outer shell of the pump from where it is forced down through a hollow tube to the bottom of the gas main by a plunger within the tube, the upper end of the plunger rod extending through another stuffing box in the top of the pump shell to a tee handle. The shaved ice and water mixture is discharged at the lower end of this hollow tube through vertical slots on each side of this tube extending from near the bottom of the main to its top, with each successive stroke of the plunger handle.

As additional shaved ice is forced into the main, it is frozen by the cold packs until a solid gas-tight ice block is formed across the whole cross-section of the main. When this stage is reached, the pump cylinder can be unscrewed, leaving the hollow sleeve in the ice block as an anchor. Gas tightness can be tested by bleeding down the pressure on the side of the ice block away from the source of supply. Tightness can then be easily maintained so long as the cold packs are kept in place.

The normal flow of gas can be quickly re-established by first removing the cold packs and then applying heat to the outside of the main. After the ice block within the main is melted, the hollow tube is removed, a brass plug is screwed into the main through the stuffing box and gas main cock with a plug inserting tool, and the saddle and gas main cock removed. The whole process is performed from start to finish without the escape of any gas, and the main is left without any saddles or other potential leak sources.

Using the above patented method and apparatus, an ice block can be formed in a 2-inch main with dry-ice packs in less than 6 minutes. This requires the equiv-

(Continued on Page 48)

Central Heating Essentials

WESTERN GAS is currently publishing a series of articles relating to each of the principal domestic appliances, and devoted to fundamental aspects of selling, sizing, installation and servicing each type. Mr. Payne's contribution, second in the series, deals with central and unit furnace heating.—EDITOR.

By EL ROY PAYNE

General Manager
Payne Furnace & Supply Company

IN THE preceding issue of *Western Gas* our mutual friend Frank C. Packer, thoroughly covered the salient features of "4 Sides to Good Water Heating." As most of the four divisions of his discussion—selling, sizing, installation and servicing—might well apply to gas heating, the writer sincerely hopes that Mr. Packer's article was digested sufficiently to bring some reward for his endeavors. There is no doubt that gas-fired home heating has made some progress during the past 20 years, but for various reasons its advancement has been much slower than that of most of the other gas appliances, and surely we cannot overlook the enormous number of electric heaters sold during the same period.

El Roy Payne

True it is that the American Gas Association Testing Laboratory has had a great deal to do with bringing up the standards of furnace construction and performance, but it has been powerless to exercise authority beyond those points. Between the Blue Star Seal of approval and ultimate consumer satisfaction is a chasm that has been bridged so many and various ways that it offers the basis for this article.

Assuming that all gas-fired furnaces or boilers have the same overall efficiency per 1,000 B.t.u. input when leaving their place of manufacture, then the question arises as to how best to apply this B.t.u. delivery for customer satisfaction. The following should therefore be divided into two parts, namely, original type of system and proper installation:

Type of System

All too frequently we find utility companies or dealers with two or three furnaces carried in stock or listed in their price books and these then must fill all of their requirements regardless of the conditions existing.

One of the outstanding reasons for the older type of home construction, which was of the square or box type with closely grouped rooms and second story directly over first floor for additional rooms, was to facilitate the winter heating problem, as the coal or wood stove then had a better chance to heat the closely adjacent rooms. The smoke pipe was frequently run through the first story ceiling and a second story heating drum was used to gain additional heat for that portion before connecting to the chimney or flue.

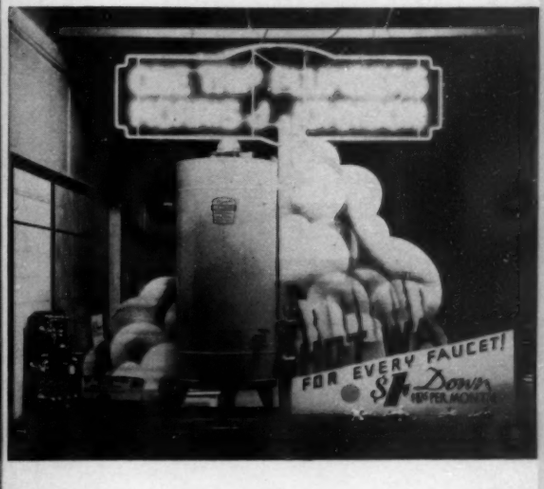
It seems to the writer that building construction has far outdistanced the heating installations, as in a great many instances a central system is still advocated for the newer rambling style of construction when a better distribution could be obtained through the use of smaller gas-fired units placed at various locations. This method reduces heat loss and friction from long runs of piping lending itself both to lower monthly (not seasonal) gas bills and customer satisfaction through rapidity of heat delivery. Right here we will take the exception mentioned in parenthesis in the last sentence. By a division of the total required B.t.u. into smaller units it does not necessarily follow that the entire home cannot be heated as properly as if one central plant were used. Quite the contrary condition exists, for when the demand exists all units may be used, the result being the same as if one furnace were turned on except that quicker heating is secured. We find the advantage on the customer's side as regards his monthly gas bill, but owing to the flexibility of this type heating, invariably he will use some of the units earlier in the fall and later in the spring, which brings the total heating season cost to the advantage of the utility company. Not only is this system favorable to the utility from the revenue standpoint, but it tends to reduce the terrific peak loads that are invariably encountered when single central furnaces or boilers are used.

We have only to prove the foregoing statements by a study of the selling and advice for installing used by our competitors, the electric heating firms. They long ago recognized that in order to bring electric heat to a basis where the fuel consumption would be within reason they would have to divide the premises into small units to be used only when in demand. This being the case, why then must the public be brought to pay more for the privilege of using gas simply because it is less expensive per B.t.u.

Some persons may argue at this point that the modern trend in home heating is directed towards complete air conditioning, which in part is true; also that when air conditioning is installed, it is then necessary to use the central type of heating plant. This last reasoning, however, is not correct as air conditioning may be applied to the unit idea of heating with equally beneficial and economical results. Since this article is to be directed toward the bulk of the home heating problems, the subject of air conditioning should be side-stepped as it comes in an entirely different field; volumes have and are still to be written on this subject.

The writer's remarks, therefore, are intended to apply to the vast majority of heating problems that come within the scope of the average purse. The endeavor should be to get a little more, originally, out of this purse for a better and more economical gas-fired installation. Also, mention should be made of the possibility for improving existing central warm air installations that are sluggish or that have improperly designed or under-sized warm air runs or registers, by the addition of blower equipment. This item has proven a boon to the heating industry as it assures proper velocities at all times and adjustment may be made that will bring even distribution to all piping at a correct outlet temperature.

(Continued on Page 48)



THREE representative window displays of cooperating plumbers, in Rockford's rental-purchase water heater activity.

Rockford's Cooperative Water Heater Rental Purchase Plan

By H. S. OYEN

Sales Supervisor, Central Illinois Electric and Gas Company, Rockford, Illinois

IN the fall of 1933, the merchandising of load-building appliances for most utilities was at a standstill. The Central Illinois Electric and Gas Co. of Rockford, Ill., was no exception. The city, being of a purely industrial type, was hard hit by the depression. Gas load was falling off, and revenues declined. Something had to be done to gain additional gas load or at least to maintain the present output.

We had heard of rental plans being used in European countries. There were some domestic gas companies which had also tried this way of popularizing gas-burning appliances. Information regarding results was scarce. Very few plans were available.

At a meeting of the executives of our company, it was decided to venture into the rental purchase plan on automatic gas water heaters. A program was drawn up to include the local plumbers.

The merchandising committee of the local master plumbers organization was called in. We submitted our plan to them. They were skeptical of our sincerity to begin with. Other cooperative plans had been tried in the past without success. Finally, the Cooperative Agreement was signed by 23 members of the Master Plumbers Organization for the rental and sale of automatic gas water heaters.

High points of this agreement were as follows:

1. The gas company agreed to rent automatic storage water heaters at $1 down and $1 per month. Total rental price on a 30-gallon heater to be $76. Later, because of increase in heater prices, the rental price was changed to $85, with $1 down and $1.25 per month.

2. The rental plan available to any gas customer on present gas mains.

3. Customer to have use of heater for as long as he chooses with option to purchase at any time during rental period. If rental payments continue for an uninterrupted period of months so that total rental paid equals the rental price of heater, the heater becomes his property. The customer may, at any time, purchase heater at a 10 per cent discount on undue balance, with all rentals applying on purchase.

4. The gas company will, during the period of the agreement, turn over all gas water heater installations to the cooperating master plumbers. Installations of heaters sold or rented by the gas company will be assigned to master plumbers in rotation.

5. Gas company to pay a flat installation charge. It also pays a selling bonus on sales or rentals actually closed by plumbers and on prospects turned in by plumbers and closed by gas company salesmen. The same selling bonus applies in either case.

6. Gas company hires and pays four salesmen who work in protected territories. These men are given the same commission on all heaters installed in their territories. This makes them just as anxious to close a plumber's prospect as one they originate themselves. These salesmen are available for plumbers' use whenever called upon.

7. The gas company, at its own expense, services all heaters during rental period.

8. The gas company agreed to list names of all cooperating master plumbers in its newspaper advertising. In all advertising where plumbers were not listed, the company agreed to use the caption "See Your Cooperating Plumber or ask any Employee of the Central Illinois Electric and Gas Co."

9. All heaters to be inspected by the gas company before installation fee is paid.

10. Gas company to furnish heaters for plumber windows and floor displays. Tie-in window displays are made from time to time at company's expense.

After signing of the Cooperative Agreement, a sales school was held for company salesmen and plumbers. The campaign began on October 17, 1933.

The program started rather slowly. We were feeling our way. Some of the

(Continued on Page 44)

REGULATOR

Causes Discussed

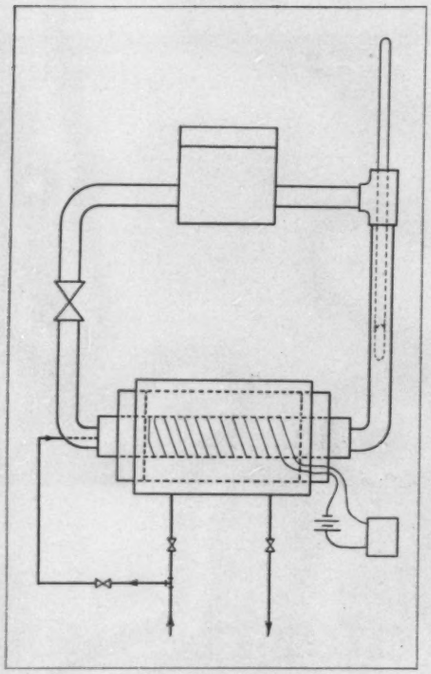


FIG. 1.
A. B. Martin apparatus for determining dew point by an electrical method.

THE difficulties arising from the freezing of regulators are particularly a function of the water vapor content of the gas, the ratio of the downstream to the upstream pressure and the magnitude of the latter and, to some extent, the peculiarities of the installation. Temperatures of the gas or air are not necessarily a factor, freezing having occurred with these values considerably above 32° F.

Gasoline or gasoline vapors themselves will not freeze, but may cause the freezing of water that is simultaneously present. This is effected when tiny particles of gasoline pass from the high to the low pressure side of the regulator, when they flash into vapor with consequent absorption of heat, largely from the gas, and cause freezing of the accompanying water. While ordinarily absorption plants remove the gasoline, they almost invariably saturate the gas with water at the outlet temperature of the absorbers.

Farm taps (offtakes to small consumers along the pipe line) are a source of continued trouble from freezing, usually because of great pressure reduction. A 2-inch tee, containing a window-screen-wire basket filled with calcium chloride, removes the water and is a simple and effective cure.

In dealing with regulator freezing it is very important to know, and use, methods for the determination of water vapor in the gas. The following methods are available:

(1) Absorption, wherein the gas is passed over or through a water-absorbing chemical, the increased weight of the chemical giving the weight of water contained in the measured quantity of gas.

(2) Adsorption, using a manner similar to the above a substance such as silica gel which attracts and holds water vapor without actually combining with it chemically.

(3) Effusion bridge, comparing, by manometer reading, the capillary flow of dried and undried samples of the gas, and interpreting this from readings on known samples.

(4) Thermal conductivity, by hot-wire resistance measurement, the wire being surrounded by the gas under test and the readings interpreted by determinations on known samples.

(5) Hygrometer, depending on the expansion or contraction of membranes or hairs under the influence of humidity.

(6) Psychrometer, or wet and dry bulb thermometer method, depending on the depression of the wet bulb temperature in proportion to dryness of the gas.

(7) Dew point, whereby the gas is cooled until its moisture condenses out and can be observed as fog on a shiny surface.

An electrical modification of the dew point apparatus has been developed by A. B. Martin of the Montana Power Co., and is shown in Fig. 1. It consists of a 1/32-inch wall tube, ¾-inch in diameter by 7 inches long, installed pressure tight through a 2-inch collar. The tube is wrapped with a pair of wires, one No. 30 S.C.C. and one No. 28, approximately 30 feet long and cemented in place with Duco cement; they are afterwards sandpapered off so bare wires are exposed but not shorted. One wire is grounded and the other led through pressure tight insulation to the outside where it is connected in series with a 2-volt flashlight battery and a 0-200 micro-ammeter. Connections are made from a refrigerant reservoir, above the collar, through the tube. A thermometer is placed in the fluid stream and a small jet of gas serves as a source of energy for circulation and also evaporates the liquid to lower the temperature. Connections are made past the wires for the sample of gas to be tested. The wires may be thinly coated with an only slightly soluble electrolyte, such as barium sulphate, though this is not absolutely necessary. As the temperature declines, due to the agitation of the gasoline, to the point of condensation of water from the sample gas passing the coils, an increase in conductivity as shown on the micro-ammeter indicates the dew point has been reached, and at such time the thermometer is read.

The above method has proven very satisfactory and the equipment is readily portable, the main objection being the difficulty of construction.

The problem of freezing regulators is aggrevated by the fact that there is a tendency for formation of a solid similar to ice (hydro-carbon hydrates) at temperatures considerably above 32° F. at high pressures. This subject is dealt with in an article in Industrial and Engineering Chemistry, August, 1934, by E. G. Hammerschmidt of the Texhoma Natural Gas Co.

The temperature loss due to pressure reduction through a regulator is a somewhat unknown quantity, being a function of the gas, the amount of reduction, the presence of gasoline vapors, and the make and type of regulator. While a small quantity of heat will be absorbed from the metallic parts, the larger quantity necessary for the expansion will be abstracted from the gas itself; inasmuch as a condition of turbulence on the downstream side delays the conversion of energy of velocity into heat energy, the better the streamline characteristics of the regulator the less freez-up should be expected. Operation of different types of regulators has shown this theory to be correct.

While there are several different equations for theoretically determining the drop in temperature through a regulator, they are cumbersome and do not check very well and the following rule of thumb equation is suggested: There will be 1° F. drop in temperature for each atmosphere of pressure cut.

It is reasonable that if there were no water present, there would be no freezing. The elimination of water may be effected by absorption, adsorption, com-

FREEZING

and Practical Remedies Suggested

By M. A. HARDIE, JR.
Measurement Engineer
The Montana Power Company, Butte, Montana*

pression or refrigeration, the latter two, however, being somewhat complicated and expensive and hardly practical when only regulator performance is involved. There are a variety of substances which will absorb water, but a careful choice must be made to suit all requirements. In Montana calcium chloride is used. The initial installation consisted of contact driers, made of baskets of steel mesh for holding flake calcium chloride, inserted in a horizontal cylinder. Experiments indicated that even though the cylinders were charged with relatively anhydrous chloride, the exterior of the flakes was coated with a film of water and, therefore, acted as a concentrated solution of the salt. Further experimentation evolved a bubble type dehydrator which has been highly satisfactory. This method is referred to and shown diagramatically in *Western Gas,* July, 1935, in a paper entitled "Dehydrating High Pressure Natural Gas" by A. B. Allyne. Because of the low price of calcium chloride it has so far been cheaper to waste the brine at isolated field bubble absorbers rather than haul it to a central regenerating point; the brine overflows with gas and is trapped in drips. A larger installation of the bubble type dehydrator treating 30 million cubic feet of gas daily has been in operation nearly a year for the Montana Power Co. At this plant brine is reactivated by steam coil evaporator.

The worst fault of calcium chloride is drying, and this is true of all absorption processes, is the fact that the ultimate dew point obtained is a function of the temperature of the brine. As such, its use would not be recommended in localities where low equilibrium temperatures are to be expected from high gas or atmospheric temperatures. An example of this is that the lowest dew point that can be expected from a 43° F. saturated solution, perfect equilibrium, is 20° F. This and other characteristics of calcium chloride as a drying agent are shown in Fig. 2. *(Continued on Page 51)*

* An abstract prepared by *Western Gas* covering a paper presented before the 1935 Southwestern Gas Measurement Short Course, Norman, Okla.

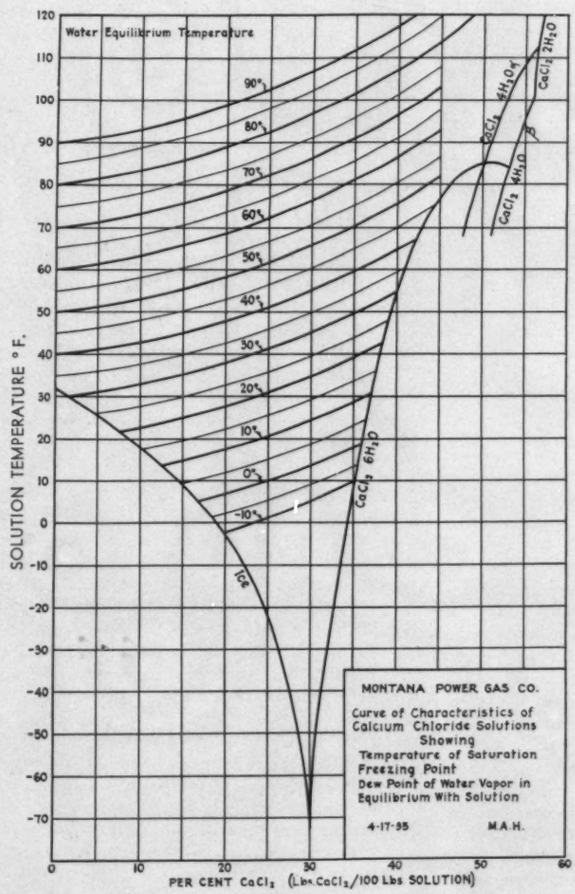


FIG. 2.

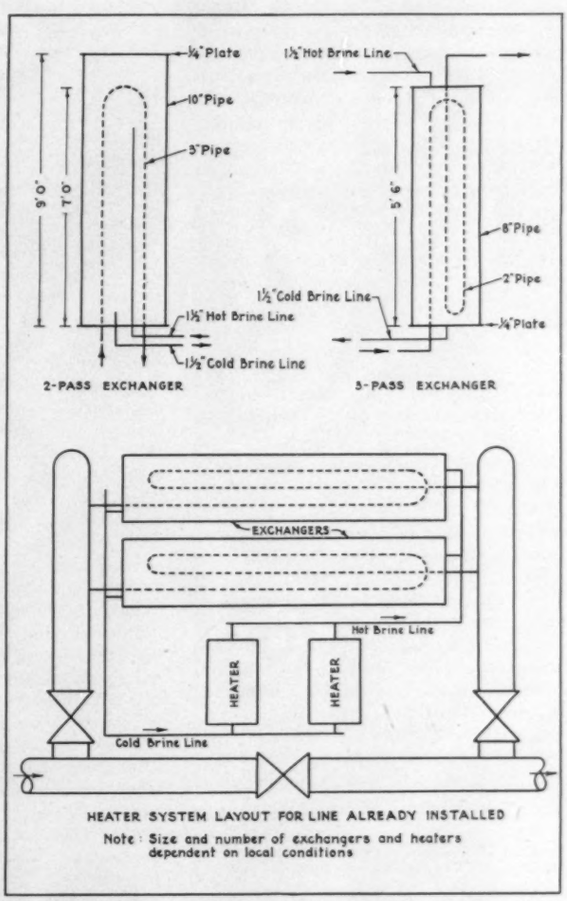


FIG. 3.

Productive Conference at Tacoma Turns Spotlight on Modern Selling

PACIFIC Coast Gas Association's Northwest Conference, an annual affair which always commands high interest, drew some 100 gas men to Tacoma, Wash., for the two-day session, July 11-12, with attendance from British Columbia, Washington, Oregon, and California.

Thomas E. Roach, vice-president and general manager of the Washington Gas and Electric Co. acted as chairman of the arrangements committee for the meeting, assisted by E. J. Ludeman, commercial manager, and R. W. Coblentz, manager of the Tacoma company's new business department. The committee and the whole Washington Gas and Electric Co. organization went the limit in providing the proper setup for the meetings. A special Northwest Conference Number of "Family Chats," company employee publication, was issued; displays of appliances and advertising copy from Northwest companies were arranged at Tacoma Hotel headquarters, and in every way the Conference took on the proportions of a complete convention.

President's Remarks: President Wm. Moeller, Jr., opened the meetings Thursday morning, July 11, complimenting the Northwest group on the fine attendance and in general for the aggressive attitude maintained for gas in the Northwest area where competition from other fuels and also political conditions are found at their worst. The Northwest for years has faced electric competition even more severe than that now obtaining in the TVA area, plus competition from cheap solid fuels, and has continued to make progress.

During his remarks, Mr. Moeller referred to a nation-wide survey made by the magazine Fortune on the public attitude toward cost of utility services and cost of government, which revealed that much more concern is shown by the man in the street over high cost of government as evidenced by taxation than over the size of his utility bills. Political propaganda to the contrary, such facts as those developed in this survey give hope for an early return to the utility's proper place in the public regard.

Elsewhere in this issue of *Western Gas* a number of the papers given at the Conference are covered. That by W. C. Mainwaring of the B. C. Electric Railway Co., Ltd., Vancouver, on the subject of "Developing Sales Leads" appears in full on Page 12, and an abstract of the paper by J. A. Ward, Republic Electric Power Corp., on "Substitution of Butane-Air for Other Types of Manufactured Gas" will be found on Page 35. Geo. R. Horning, Seattle Gas Co., spoke on "The Reduction of Production Costs," and his paper will appear in an early issue.

SYMPOSIUM ON SERVICE

C. R. Miller, superintendent of utilization for Portland Gas and Coke Co., was responsible for an outstandingly successful item on the Conference program in the "Symposium on Service" which he conducted. This general discussion feature was participated in by numerous executives of companies represented and went deeply into the why's of service difficulties together with favored methods of meeting them.

Opening the discussion Mr. Miller put these initial questions: Why should we have service calls? How many such calls are really justified? To whom are they chargeable? While it is impossible to offer a definite prescription for service, said Mr. Miller, the process of taking our product from the point of delivery to ultimate satisfactory usage in the customer's home is as broad as the industry itself. It proceeds from the stage of management policies, through all the operating functions—production, distribution, utilization, servicing and customer's office transactions — to the customer; with contributions along the way from the appliance manufacturer, home service demonstrator, advertising department and other agencies.

Mr. Miller split existing service policies into three classifications—those officially prescribed, those that "grew up" to be generally accepted, and those that have not yet grown up. In connection with this last class, Mr. Miller stated without fear of contradiction that company service policies as a rule leave much to be desired. He pointed to the service division of the typical utility as that division which acts as shock absorber and mopper-up for the whole organization. When gas plant, main system, inferior appliances or exaggerated advertising claims create their inevitable customer problems, the service division must shoulder the blame from the customer, and sometimes from poorly informed individuals within the company itself.

To guide discussion Mr. Miller raised a number of significant questions as to what type of men are now employed in service work, what wage scale is paid them, how they are equipped, how they are trained, what appropriations are made for service per customer — in short, what is the measuring stick of service? Following his remarks an open discussion entered into by most of the 50 utility and manufacture representatives present, continued for two and a half hours. To mention only one thing developing out of the exchange of experiences, it appeared that the companies represented varied widely in the amounts spent per customer on service work. The range was from 50c to 70c per year per meter.

A good share of the meeting was given over to sales promotion. Jas. F. Pollard, vice-president and general manager of the Seattle Gas Co. was on the program twice, once with a number of suggestions for tying in with the Federal Housing Program, and again with a description of the "Homemakers' League" in Seattle.

Rental-Sales at Portland: Rental-Sales plans and long term financing was the topic handled by B. H. Parkinson, commerical manager of Portland Gas and Coke Co. Mr. Parkinson reviewed experience of the Portland company in this activity during the first six months of 1935, stating that 88.7 per cent of the year's quota for company and dealer sales had already been reached, with sales of $477,940, as compared with $150,000 combined sales for the same period in 1934. Individual appliance sales were as follows:

Ranges and cookers	2,756
Hot plates	371
Refrigerators	585
Automatic water heaters	1,610
Tank water heaters	846
Boilers and furnaces	105
Conversion burners	328
Floor furnaces	15
Space heaters	65
Radiant heaters	116
Miscellaneous	166
Total	6,963
Dollar value	$477,940

Tacoma Sales Promotion: John B. Goff of the Izzard Co., Tacoma advertising agency, in his talk on new business development problems of utilities went briefly into the Tacoma situation. While Tacoma has the nation's lowest electric rate and intense competition from municipally owned power plants, the company is making real progress in getting acceptance for gas as the modern fuel. He referred to the Tacoma campaign featuring a "guaranteed gas bill for real automatic hot water service," and also to the company's radio program on gas heat. Competition of coal, oil and sawdust fuels for the home heating market is being successfully met by stressing the reliability of gas company service. In selling manufactured gas for house heating the Tacoma Company's radio program uses this key message, "Don't assume that gas heat is expensive and that you can't afford it. Get all the facts."

Dealer Sales in Oregon: Organization of the Oregon Gas Appliance Society and results from its cooperative program were described by J. King Bryon, managing director of the Society. Mr. Bryon summarized the organization's code of fair practice as being, "Not to compete on prices, terms, downpayments, trade-in allowances or carrying charges, but rather to sell merchandise on its value and let the best salesman and house service win." When the utility company must establish any one of the above practices on any premise other than a fair merchandising premise, participation should be made available to any cooperating dealer on the same terms.

Dealer members of the Society increased their business 228 per cent during the first half of 1935 over the same period in 1934, and in this connection it is to be noted that

the Portland Gas and Coke Co. did not merchandise in 1934, and did merchandise in 1935.

Employee Load-Building: E. J. Ludeman, commercial manager, Washington Gas and Electric Co., dealt with his company's method of organizing employees for retaining present load, restoring lost customers, increasing present customer consumption, and developing new business. When employees become commercial minded, said Mr. Ludeman, all of their customer contacts are improved.

T. E. ROACH

Arrangements Chairman for Tacoma Conference

Using the A.G.A. course on gas cooking, the Washington G and E. has fostered a plan of employee education in small groups. Particularly interesting is the fact that the training has been extended to include wives of employees, a special seven-lesson course being devised for this purpose. Employees' wives are actually turning in prospects and drawing commissions on sales.

Employee campaigns are arranged to give maximum credit for sale of quality appliances and appliances replacing competitive fuels. Bonus and prize money during a typical campaign averages about 2 to 2½ per cent of the net sales value of appliances sold.

From 24 to 49 per cent of the company's employees have turned in prospects or sold appliances in the various employee campaigns. Bonuses and commissions in 1934 went to 64 per cent of all employees, and thus far in 1935 payments have already been made to 58 per cent of all employees.

In a campaign to reconnect inactive services selected groups of employees are making evening calls under direction of a salesman, using a list of former customers made for the purpose.

Large versus Small Cooking Schools: This subject was assigned R. W. Coblentz of Washington Gas and Electric, who listed the following disadvantages of the usual type large cooking school, run in cooperation with a newspaper: Gas fuel and gas appliances are only one item among many featured. The newspaper's primary interest is profit, accomplished by selling advertising to different food concerns, and this type of school has become so remunerative that it is now something of a "racket." Prizes of gas appliances often given at such schools are frequently wasted as they go to winners living off the gas main or in an apartment house where the equipment cannot be used. Because of the size of the audience and the number of items to be promoted it is impossible for the demonstrator to convey an intimate picture of gas and modern gas appliances.

The small cooking school, said Mr. Coblentz, is not subject to the above disadvantages, as the gas company selects the audience and handles the program to serve its own special objectives.

In Tacoma the gas company has been highly successful in putting on a series of small schools in department stores, which arrangement was adopted because the company did not have an assembly hall. The company offered a small payment to ladies who would sponsor these schools and guarantee a minimum attendance of 50 persons. Districts of the city from which the attendance was desired were selected and contacts made with women's organizations. Immediately upon starting the weekly classes a large waiting list was created, and all available dates for the balance of the year were taken by April. A second store wished to conduct similar classes and the company accepted. These classes began the middle of April and are now booked full for the rest of the year. Average attendance has been 59 for each class.

Territory sales representatives report that the classes definitely break down sales resistance, and have converted many prospects for electric ranges to gas. Due to the possibility of selecting audiences carefully, and contacting them intimately with a definite gas story, the small cooking school is decidedly preferred by the Tacoma company.

"Free Gas" Offers: Coast Counties Gas and Electric Co., serving 18,000 domestic gas meters in Northern California, recently inaugurated a "Free Gas" promotion described to the conference by H. W. Edmund, sales manager for the company. As a preface Mr. Edmund described the "free gas" type of promotion as "strong medicine" which should be used only on systems having reserve strength in the form of gas supply and ample distribution facilities. The Coast Counties system met these requirements, and also had a low heating load saturation which it is desired to build up.

In its offer the company made available to domestic and commercial firm gas consumers, for the two months commencing with the January billing, an unlimited use of gas for a monthly charge not to exceed the amount of the bills paid by them in January. All merchandising promotion and newspaper publicity featured the plan, and reaction from both employees and consumers was immediate and very favorable. Summarizing customer acceptance, 48.5 per cent availed themselves of free gas; 29,171 M c.f. or 19 per cent of total gas sales was free gas. Retail value of the free gas was $36,972, or 21.8 per cent of total gas paid for. During the free gas offer a total of 25,000 M c.f. annual load was added in appliances sold by dealers and company, including numerous heating units and automatic water heaters. New business costs for February and March were $4,000 higher than last year, which with a slight increase in billing expense, constitutes the cost of the campaign above the wholesale gas cost.

Contests That Sell: In his remarks on competitive sales contests, Norbert O. Fratt, domestic sales manager for the Seattle Gas Co., stressed the need for injecting fun into sales work, for setting contest quotas sufficiently high to call for extra effort and still make them attainable, and for some form of special compensation—this last being the least important of the three. Mr. Fratt also believes in supplying incentive for getting salesmen to work promptly in the morning, and for turning to account the gambling instinct which is present in most people.

As a case in point, he described the Seattle Gas Co.'s "Spin the Meter" contest which incorporated all of the points mentioned above. This contest evaluated sales accomplishments in terms of cubic feet for each appliance, spinning the individual salesman's meter in proportion to his sales, with emphasis placed upon particular loads which the company wishes to stress. In addition to load gained by sales, the salesman each morning was allowed to spin a meter dial at company headquarters, the reading being added to his total. High sales for the previous day entitled him to an additional spin. Failure to check in at headquarters each morning was considered as a "leaky meter" and 500 cubic feet was deducted from his meter total.

To the above set-up was added a modest compensation plan with weekly bonuses, etc., and 50c per thousand for all additional load over 50,000 cubic feet. Attaining the 50,000 mark was worth $10 in special revenue to each salesman.

The campaign sold $44,000 in gas appliances and aroused so much enthusiasm that it was repeated the month following, during which $35,000 was sold.

Entertainment: In addition to the strong business program reviewed above the meeting included a fellowship luncheon on Thursday. D. J. Young was the luncheon speaker, discussing the function of money in the economic system. A dinner dance at the Tacoma Country and Golf Club Friday night was also greatly enjoyed. One hilarious note at this affair was the surprise presentation of a birthday cake and oversized box of toys to Captain A. E. Higgins of the American Gas Association, whose birthday fell on the same date.

A tea at the home of Mr. and Mrs. T. E. Roach, held on Thursday afternoon, and a bridge luncheon on Friday at the Fircrest Golf Club, were arranged for the entertainment of ladies in attendance at the Conference.

Calendar

August

American Chemical Society — Annual Meeting, San Francisco, Calif., week of August 19.

September

Wisconsin Utilities Association — Commercial Section Convention, Milwaukee, Wis., September 9-10.

Pacific Coast Gas Association—Annual Convention, Hotel Huntington, Pasadena, Calif., September 17-19.

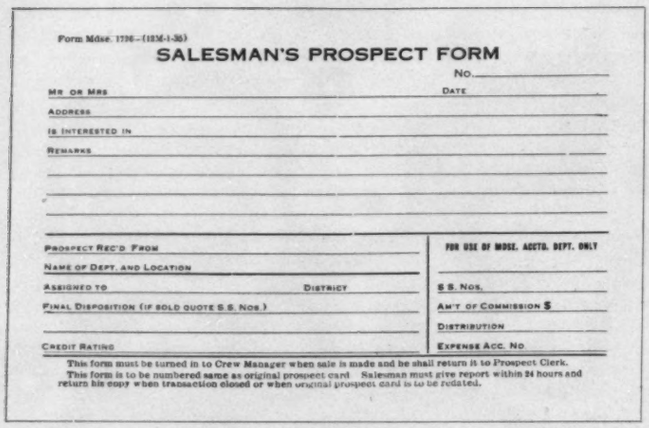
October

American Gas Association—Palmer House, Chicago, Ill., October 14-18.

November

American Petroleum Institute—16th Annual Meeting, Biltmore Hotel, Los Angeles, Calif., November 11-14.

American Institute of Chemical Engineers—Annual Meeting, Columbus, Ohio, November 13-15.



Form Mdse. 1726—(12M-1-35)

SALESMAN'S PROSPECT FORM

No.

MR. OR MRS. DATE

ADDRESS

IS INTERESTED IN

REMARKS

PROSPECT REC'D FROM

NAME OF DEPT. AND LOCATION

ASSIGNED TO DISTRICT

FINAL DISPOSITION (IF SOLD QUOTE S.S. NOS.)

CREDIT RATING

FOR USE OF MDSE. ACCTS. DEPT. ONLY

S.S. NOS.

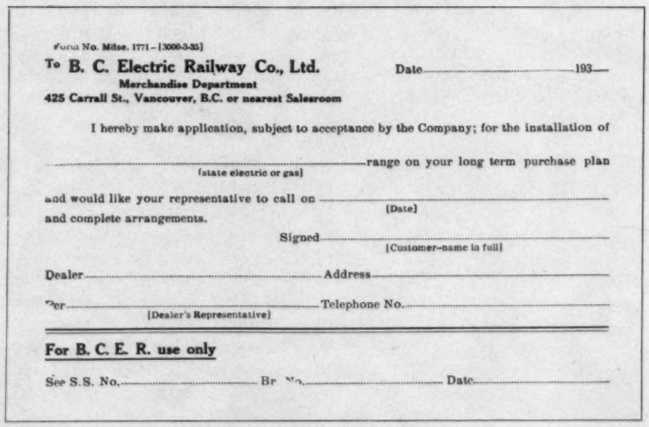
AM'T OF COMMISSION $

DISTRIBUTION

EXPENSE ACC. NO

This form must be turned in to Crew Manager when sale is made and he shall return it to Prospect Clerk. This form is to be numbered same as original prospect card. Salesman must give report within 24 hours and return his copy when transaction closed or when original prospect card is to be redated.

FIG. 4. Form No. 1726.



Form No. Mdse. 1771—[3000-3-35]

To B. C. Electric Railway Co., Ltd. Date 193

Merchandise Department

425 Carrall St., Vancouver, B.C. or nearest Salesroom

I hereby make application, subject to acceptance by the Company; for the installation of

range on your long term purchase plan

(state electric or gas)

and would like your representative to call on (Date)

and complete arrangements.

Signed (Customer—name in full)

Dealer Address

Per (Dealer's Representative) Telephone No.

For B. C. E. R. use only

See S.S. No. Br. No. Date

FIG. 5. Form No. 1771.

25 Methods for Developing Sales Leads

ice department was privileged a few days ago to repair your electric iron, and as our company is particularly anxious to see that every appliance you have in service is giving you the very best satisfaction, I was asked to call and report whether the repair made was entirely satisfactory to you." Naturally we want to know that these repairs are satisfactory, but immediately this secures the customer's confidence and the salesman is in the home where he can talk about some other appliance.

8th Method—is a sales lead given on form No. 1737 for all engagements, marriages and births which are recorded in the daily papers: Engagements and marriage notices form an excellent list of prospects for ranges and water heaters, and births provide an excellent list of prospects for refrigeration because with the introduction of a baby into the home we have an opportunity to provide the finest health talk imaginable.

9th Method—is building permits, and these are all passed on to our salesmen on form No. 1737 for investigation.

10th Method—is a list of new gas service orders issued, and as these often do not originate in the sales department a lead is given to the salesman so that he can make absolutely sure the service is going to be used.

11th Method—is a record of all gas meter installations, which we have our salesmen follow to make sure the customer is provided with proper appliances and that he thoroughly understands them.

12th Method—is leads that we secure from cooking schools, exhibitions, and other promotional activities such as our home modernization bureau.

13th Method—refers to coupon slips which we receive from advertisements, circulars, and our monthly 'Home Service News.'

14th Method—is contacts made where we get a request for a gas meter disconnection. We have found during the last two years that a large number of our gas meter disconnections have been brought about through

(Continued from Page 13)

customers purchasing fuel ranges with oil burners and sawdust burners, and we have been highly successful in meeting this competition. The moment the work order department receives a request for a meter removal it makes up a card entitled "Request for Removal of Gas Meter" in duplicate and sends it to the merchandise office. A salesman is sent out to investigate at once and the work order department does not act on the disconnection for at least 48 hours unless it is an emergency call where the building is being taken down, so that this gives our salesman time to see just what can be done. We had months where there would be 500 or 600 disconnections during the month, and as this was done by a department entirely removed from our sales department no effort was made to see why the disconnections were taking place. It is amazing how many of these disconnections we have stopped, and during the last six months we have sold 257 combination gas and coal ranges, most of them to customers who intended to take out their gas range and install a fuel range with oil burner.

15th Method—is a follow-up we make in all cases where customers ask for final readings on gas or electric ranges, to see just where the customer is moving and to make sure he is supplied with all needs in the new location.

16th Method—is leads we secure from the Welcome Wagon Service.

17th Method—covers leads secured from members of the Vancouver Electrical Association, to whom we pay the same bonuses as to our employees at large, shown on card No. 1725 (Fig. 3).

18th Method—is prospects secured from all other dealers, such as, music and radio dealers.

19th Method—covers prospects secured from members of the Sanitary & Heating Engineers Association, whom we have interested tremendously in water heating; we pay them a bonus of $12 on every storage water heater prospect given to us which we are able to sell, and this is considerably more than they make on a tank replacement.

In connection with the prospects received from the Vancouver Electrical Association and members of the Sanitary & Heating Engineers Association, we have a card No. 1771 (See Fig. 5), which the dealer gets the customer to sign, making application for either one of our long term ranges or storage water heaters.

20th Method—is in connection with prospects received from real estate agents. Real estate agents pass many hundreds of tenants through their offices each month and we have secured the interest of these agents to the extent that they send prospects in to us and we pay the same bonuses as provided on form No. 1725 (Fig. 3).

21st Method—is prospects secured from gas main extensions, which I am quite sure all companies follow very closely.

22nd Method—is prospects secured from all of our light and power extensions, which naturally lead to gas business as well as to electric.

23rd Method—covers leads secured from our appliance repair servicemen, who turn in a report showing the age and condition of appliances that they feel should be replaced, and also leads for other appliances that, from their conversations with customers, they feel the customers might be interested in.

24th Method—is leads secured from the Swap or Exchange column in our newspapers. Customers often wish to swap merchandise for which they have no use for some gas or electric appliance, and it is often possible to interest them in a new or used appliance on a basis that is more profitable to them than exchanging and to suggest they sell the item they wish to exchange through a second-hand dealer. Also under "Want" headings in the newspapers customers may often be found who are looking for used gas or electric appliances.

25th Method—covers leads given to our salesmen from our customers' appliance sur-

RELIABILITY
is what counts

Steel pipe is increasingly demonstrating its superior reliability for gas mains. Throughout the country gas companies find that modern steel pipe is the material most capable of withstanding the strains of vibration (heavy street traffic), trench pressures, shocks, cave-ins, settlement from filled ground (insecure foundation) and other factors that place a heavy burden on underground lines.

Tried and tested time and time again, steel pipe has met in a highly successful way the combined requirements of safety, efficiency, and economy. Municipalities and private users in all parts of the country depend more and more upon steel pipe for main supply, laterals and service lines.

Specify NATIONAL Steel Pipe for superior performance. Made to rigid specifications by the largest manufacturer of steel tubular products in the world. In NATIONAL Steel Pipe you will secure:

1. Reliability.
2. Great tensile strength.
3. A high degree of ductility.
4. Adaptability for any type of joint.
5. Less interruption to service.
6. Lower laying costs.
7. Longer lengths.
8. Tighter joints and less joints per mile.
9. Various coatings available for bad soil conditions.

NATIONAL engineers will be glad to answer questions on gas main problems.

NATIONAL TUBE COMPANY
PITTSBURGH, PA.

Pacific Coast Distributors
COLUMBIA STEEL CO., San Francisco, Calif.

Export Distributors
UNITED STATES STEEL PRODUCTS CO., New York, N. Y.

United States Steel Corporation Subsidiary

NATIONAL
STEEL GAS MAINS

vey. We surveyed our 80,000 customers and made a master record of all the appliances, both gas and electric, in use in their homes. For the benefit of those who might undertake such a survey, let me suggest that they do not attempt to do this with salesmen because the salesman is not interested in this class of work and must be paid altogether too high a price per card to be sure that an accurate record is being obtained. We tried it with salesmen first and failed. We then made the survey through our meter readers and this proved an excellent plan, and we were able to survey our entir 80,000 domestic customers in 90 days. We paid our meter readers from 1½ to 3 cents per card, depending on whether the customer lived in a city or rural area, providing the card was signed by the customer, which was an indication to us that the information was accurate. We go through these cards continually and make up sufficient sales leads, showing the salesmen just what the customers are using and what we feel, from the area where they are living, that they might be interested in, and in this way balance up the number of leads we give to the salesmen, taking into consideration all the leads secured from the other sources mentioned. This is also an excellent record when we decide to do some direct mailing work. As an example: We decided a few weeks ago to offer our customers, where there were dead gas services in the home, a small range or hotplate or water heater free if installed with a prepayment meter. We were able to go through these cards and immediately locate our 4,000 dead services and circularize all of them. The response to this direct mailing was enormous and it is quite apparent that within the next two or three months we will be able to bring 20 or 25 per cent of these services into use. We use small colored tabs on these cards in our files so that if we wish to make a mailing to all of our customers having a particular appliance now in use we can run through the files and select all of the cards indicated by that particular color.

Any company endeavoring to build new load through the efforts of a group of salesmen must do so scientifically if it is to get the greatest value from the efforts of the salesmen. Salesmen, generally speaking, do not wish to be burdened with detail, but if they have a definite job to do they will usually follow it through. If you can give your salesman 10 or 12 definite leads of some kind to follow up when he leaves the office in the morning he is going to approach these prospects with enthusiasm and with the feeling in his heart that the entire organization is behind him in his efforts. This is intensive, scientific sales work, and without doubt it brings results.

Service Schools New Oklahoma Natural Project

FOR the benefit of Home Service Directors, service men, sales department personnel and local managers of its smaller towns, Oklahoma Natural Gas Co. last month conducted two service schools. One was held July 9-10 in Oklahoma City, with 60 company employees present, and the other July 11-12 in Tulsa, with 45 attending. Thos. E. Bartlett, sales supervisor for the company, was general chairman and handled arrangements for the meetings.

A complete program on servicing topics was conducted at each school, with separate speakers drawn mostly from company employees dealing with separate appliances. In addition to talks on individual appliance servicing such subjects as the following were on the program. Operating procedure effecting service, service men's duties and their effect on public relations, chemistry of gas, relation of home service to the service department, load building opportunities, service department procedure and company policies.

Gas appliances were connected up for service demonstration and illustration of sales points, and home service representatives added to the interest by demonstrating for the benefit of service men how they could adjust ranges when the need arose.

Similar service schools will be conducted again this fall, and it is planned to open them to dealer employees as well as company representatives.

Christy Payne Retires from Standard of New Jersey

Retirement of Christy Payne, vice-president, treasurer, and director of the Standard Oil Co. of New Jersey, was recently announced. Mr. Payne is widely known throughout the gas industry, having served as president of the Peoples Natural Gas Co. and allied units.

Among the extensive natural gas enterprises Mr. Payne helped pioneer were the 1,100-mile pipe line from the Panhandle, Texas, gas fields to Chicago in 1931; the Louisiana to St. Louis line in 1929, and other long distance natural gas lines to Denver, Colo., Baton Rouge, La., and other important cities.

Chelf Gets Promotion with Public Service Co. of Colo.

F. Marion Chelf, for a number of years superintendent of the house heating division for the Public Service Co. of Colorado, Denver, has been made superintendent of the industrial gas, commercial gas and district steam heating division, the post formerly occupied by C. W. Gale, who was recently appointed new business manager of the Knoxville (Tenn.) Gas Co.

Mr. Chelf entered the company service from the University of Denver in 1923. Since then his work has been in connection with sales, installation, utilization and general application of gas for domestic and commercial purposes.

Subsistence Homestead Project Provides Gas Service

THE first government subsistence homestead project in California, now nearing completion at El Monte, is to be supplied with natural gas. Living rooms and bedrooms are to be heated with natural gas wall furnaces. A natural gas water heater is installed in each home and the connections are provided for gas range and refrigerator. Service lines for the entire tract at El Monte were installed by Southern Counties Gas Co. Lines for a similar tract of 40 acres near San Fernando were laid by the Southern California Gas Co.

Five different types of houses with 17 variations in design are being used in the El Monte project. A tract of land ranging in size from 64-hundredths to 94-hundredths of an acre goes with each home, which includes a living room, dining room, kitchen, bathroom and from one to four bedrooms.

The Resettlement Administration of the Department of Agriculture is selling these homesteads to selected families having not less than $50 a month nor more than $100 a month income. Prices range from $2,500 to $3,800, and payments are spread over a 30-year period.

The project also includes a $5,500 community building, to be situated in a 1½-acre demonstration garden. In this building will be a community canning kitchen, equipped with modern gas appliances.

Fort Worth Gas Dilution Subject of Special Hearing

Early in August a special master appointed by the Federal Court will conduct a hearing on facts involved in the ordinance passed by the Fort Worth city council some time ago, prohibiting the service of diluted gases to Fort Worth consumers by the Lone Star Gas Co. Lone Star secured a temporary restraining order against enforcement of the ordinance. It is understood that U. S. Bureau of Standards representatives, who have been investigating Lone Star's stabilization processes for some time, will release their report by August 1.

Promotions in So. Calif. Gas Co. Distribution Department

L. L. Biggs, formerly leakage engineer for the Southern California Gas Co., has been advanced to the position of general street foreman of the Los Angeles operating division, according to Lee Holtz, general superintendent of manufacture and distribution for the company. Walter Piper, district street foreman of the Glendale division, is now acting in the same capacity for the Beverly Hills district of the Los Angeles operating division.

Fort Dodge Packing Plant Utilizes Natural Gas as Boiler Fuel

The Fort Dodge (Iowa) Gas and Electric Co. is supplying natural gas to the recently inaugurated 4 million dollar plant of the Tobin Packing Co., for utilization as boiler fuel. The packing plant has facilities for handling 3,000 hogs per day in a rendering system which the company has installed in conjunction with packing plant operations.

THE WECO PRECISION COMBUSTION CONTROL

(DRAFT COMPENSATING TYPE)

The Weco Precision Combustion Control (Draft Compensating Type) is entirely automatic in operation. It is an efficient, compact, powerful, and dependable machine, regulating the gas-air ratio at all loads and maintaining it at a pre-determined point.

It results in *substantial fuel saving.* It *maintains a constant gas-air ratio, reduces operating labor costs* due to its being fully automatic. It *reduces furnace maintenance* because it prevents unbalanced furnace temperatures, *increases efficiency* of the apparatus consuming the steam because of its ability to hold the steam pressure constant.

There is one feature of the Weco Precision Combustion Control (Draft Compensating Type) that is particularly noteworthy—it does all its proportioning outside of the furnace. The proportioning device is so designed that the velocity of gas and air actuate the control before entering the furnace, resulting in a positive gas-air ratio regardless of furnace shape, size, or eddy current conditions.

This design was chosen because it was found in our experience that high CO_2 at minimum and low ratings could not be maintained by controls actuated from furnace pressure, (especially on natural draft) because the furnace pressure was not sufficiently stable.

This experience taught us, therefore, that the correctly designed porportioning device should be designed to operate from the outside of the furnace where it is not affected by the vagarities of furnace pressure, hence the Weco Proportioning Device was thus designed and its operation is always positive.

Another important feature is the Weco Motor Modulator. We found it necessary to develop this device ourselves as no manufacturer of pressure devices could meet the specifications necessary to derive the exacting conditions met in the control of steam pressure on the average boiler. This modulator is of extremely sturdy design with no open or sliding contacts, and using the well known and well tried Bourdon Tube as the actuating element.

THE WEBSTER ENGINEERING COMPANY

Division of Surface Combustion Corporation—Sales and Engineering Service in Principal Cities

Also Represented by

Natural Gas Equipment Co.	F. J. Evans Engineering Co.	Mechanical Equipment Co.	Industrial Heating Co.
Los Angeles and San Francisco	Birmingham, Ala.	Houston, Texas	Dallas, Texas

TABLE NO. 4. COMPARISON OF COST OF STEEL AND COPPER MAINS INSTALLED DURING 1934.

	ACTUAL COSTS (Dollars per Ft.)				COMPARABLE COSTS (Dollars per Ft.) (Cost elements not affected by type of pipe have been equalized)			
	2 in. Steel	2 in. Copper	3 in. Steel	3 in. Copper	2 in. Steel	2 in. Copper	3 in. Steel	3 in. Copper
Total feet installed	72,723	47,819	8,463	24,022				
Pipe (uncoated)	.1920	.4036	.3414	.4370	.1920	.4036	.3414	.4370
Fittings	.0081	.0153	.0186	.0261	.0081	.0153	.0186	.0261
Welding Material	.0078	.0133	.0140	.0164	.0078	.0133	.0140	.0164
Protective Coating	.0059	.0007	.0136	.0016	.0059	.0007	.0136	.0016
Total Material Cost	.2138	.4329	.3876	.4811	.2138	.4329	.3876	.4811
Foreman	.0112	.0253	.0164	.0290	.0182	.0182	.0227	.0227
Trenching	.1241	.1771	.1422	.1924	.1506	.1506	.1673	.1673
Pipe Laying	.0358	.0483	.0533	.0555	.0358	.0483	.0533	.0555
Application of Protective Coating	.0089	.0020	.0123	.0017	.0089	.0020	.0123	.0017
Paving	.0143	.0448	.0114	.0382	.0295	.0295	.0248	.0248
Total Labor Cost	.1943	.2975	.2356	.3168	.2430	.2486	.2804	.2720
Auto and Compressor	.0203	.0262	.0216	.0388	.0232	.0232	.0302	.0302
Tool Expense	.0127	.0173	.0159	.0200	.0155	.0146	.0164	.0159
Management Expense	.1091	.1491	.1362	.1712	.1325	.1355	.1530	.1483
Total Misc. Cost	.1421	.1926	.1737	.2300	.1712	.1733	.1996	.1944
TOTAL COST	.5502	.9230	.7969	1.028	.6280	.8548	.8676	.9475

Use of Copper Pipe for Gas Distribution

Since the publication of the 1932 paper we have found no new evidence bearing on this point that would tend to modify the conclusions drawn in that paper.

The internal corrosion of copper pipe by gas is not proving to be a problem with us

(Continued from Page 11)

because of the almost complete absence of hydrogen sulphide from the natural gas which we distribute.

TABLE NO. 5.

	SOIL CLASS I 0 to 2,000 Ohm cms.	II 2,001 to 9,999 Ohm cms.	III 10,000 and over Ohm cms.
Services:			
(a) Working pressure 50 lb. per sq. in. or less	Copper or C-in-C	Copper or C-in-C	Bare steel or C-in-C
(b) Working pressure more than 50 lb. per sq. in.	HW steel	MW steel	Bare steel
Mains:			
3 in. in diameter and smaller (a) Working pressure 50 lb. per sq. in. or less	Copper or C-in-C	MW steel or C-in-C	Bare steel or C-in-C
(b) Working pressure more than 50 lb. per sq. in.	HW steel	MW steel	Bare steel
4 in. in diameter and larger	HW steel or Cast iron	MW steel or Cast iron	Bare steel

EXPLANATION OF ABBREVIATIONS:

C-in-C—copper pipe installed in a conduit of old steel pipe.
MW steel—steel pipe protected with coal-tar primer, two coats 180° m.p. coal-tar and an outside bonded wrapper of asbestos felt.
HW steel—steel pipe protected with same coating as above to which one coat of coal-tar and a second wrapper of asbestos felt are added.

Cost Data

Recent costs (including company handling charges) of small diameter copper, bare steel, wrapped steel, and cast iron pipe are given in Table No. 3.

Prior to November, 1934, we installed steel services protected with two coats of coal-tar and an outside wrapper of asbestos felt in all areas excepting those in which the soil is known to be very corrosive. In these latter areas copper was installed.

An analysis of the cost of services then disclosed that the average cost of all ¾-inch services installed between January 1, 1934 and August 31, 1934 was as follows:

¾-inch wrapped steel services $.7456 per foot
¾-inch copper services .7509 per foot

Although there was a difference of $ .07 per foot in the cost of the pipe, the installed cost of the copper services was only ½-cent per foot higher than the installed cost of wrapped steel services. The lower cost of installing copper services is attributable in part to the cost of applying protective coatings to steel services, and in part to the greater ease of handling and working with copper pipe.

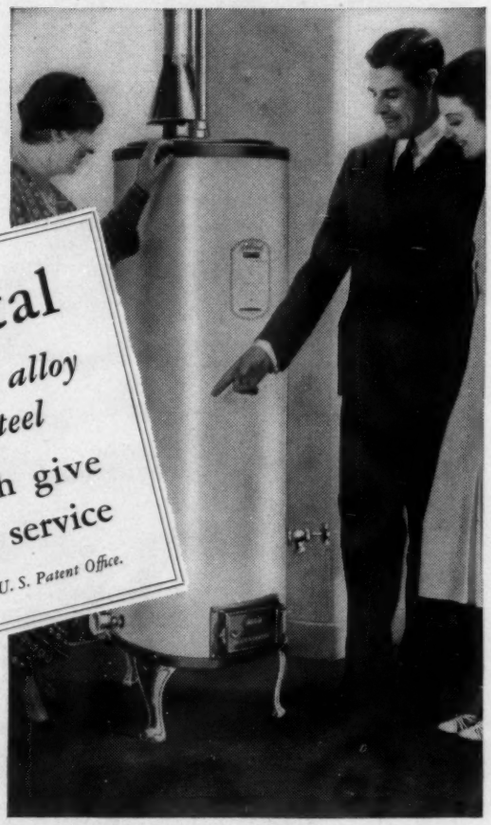
We have discontinued the installation of wrapped steel services because of these cost figures and now install copper services in all soils which are too corrosive to permit the use of bare steel.

The costs of 2-inch and 3-inch copper and steel mains installed during 1934 are given in Table No. 4. The first four columns give the actual costs as they appear

Better Value...

for the Utility...for the Public

when the tank is Everdur



Everdur Metal

A non-rust copper-silicon alloy with the strength of steel

Ideal for tanks which give long and dependable service

The trade-mark "Everdur" is registered in the U. S. Patent Office.

The Welsbach HOTZONE Automatic Gas Water Heater may be had with an all-welded tank of non-rust Everdur in 15, 20, 30 and 45 gallon sizes. Cutaway view shows details of construction. Made by Welsbach Co., Gloucester City, New Jersey.

Water heater tanks of non-rust Everdur offer maximum value, to the utility company and to the consumer as well. Here are the reasons: They give satisfactory service indefinitely . . . cost the buyer far less in the long run. They do away with all rust troubles . . . require far less servicing. They provide steady consumption of gas . . . rust cannot interfere with their performance. Their price is unusually attractive . . . they offer the greatest *value* obtainable. And they are readily available.

Everdur is copper, specially alloyed with silicon to provide the strength and welding properties of steel. Since Everdur is immune to rust, yet possesses these superior physical advantages, leading makers of automatic heaters and range boilers have standardized on Everdur for rust-proof tanks.

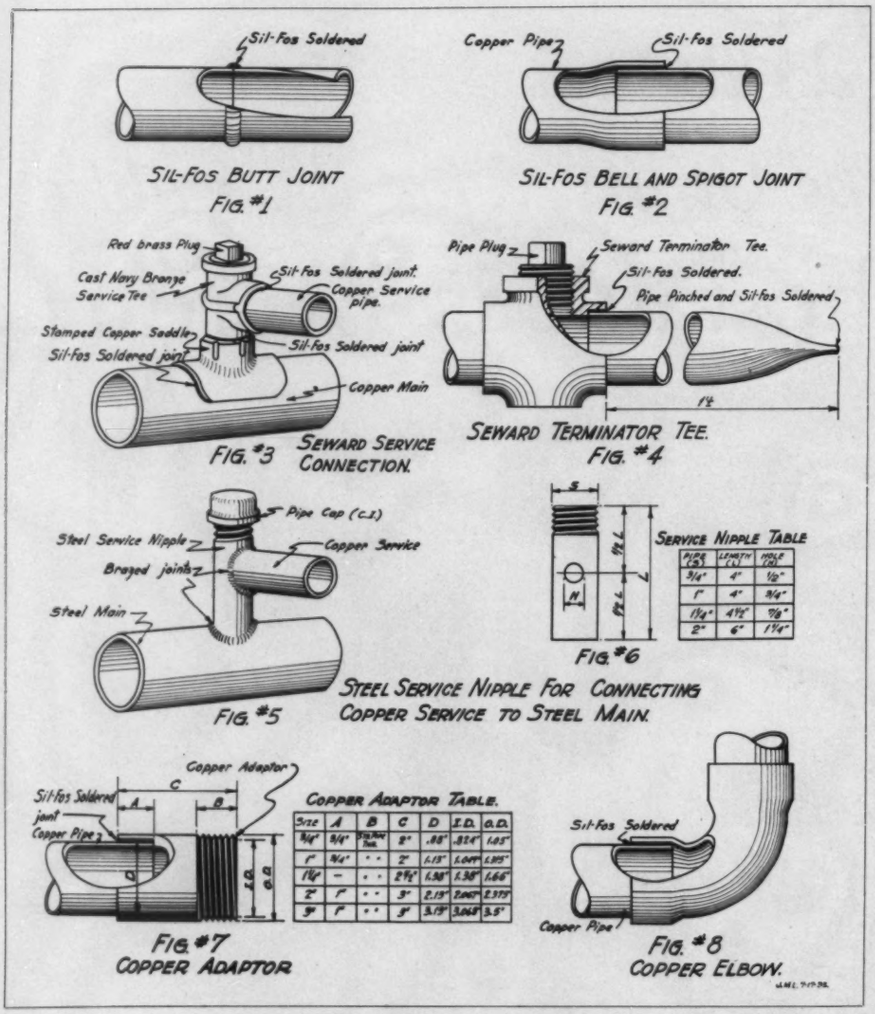
In considering the best interests of your customers . . . and of your company as well . . . we suggest a thoughtful consideration of the advantages of advocating the sale of heaters with Everdur Tanks.

EVERDUR METAL
"Everdur" is a registered trade-mark, identifying products of The American Brass Company made from alloys of copper, silicon and other elements.

THE AMERICAN BRASS COMPANY
General Offices: Waterbury, Connecticut
Offices and Agencies in Principal Cities
In Canada: ANACONDA AMERICAN BRASS LTD., New Toronto, Ont.

ANACONDA
from mine to consumer

EVERDUR METAL *for* TANKS



COPPER PIPE JOINTS AND FITTINGS

on our books. However, these figures cannot be used directly to determine the relative cost of steel and copper mains because copper mains are installed only in corrosive soils which are very often heavy adobes in which the cost of trenching is high. On the other hand, steel mains are installed in non-corrosive soils which are usually light sandy loams in which the cost of trenching is low. Then too, most of the copper mains installed during 1934 were installed in cities to replace leaking steel mains, while most of the steel mains were extensions in rural territory to get new business; consequently, there are more pavement replacement costs included in the copper figures than in the steel figures.

In the last four columns of Table No. 4 those costs that are not affected by the type of pipe used are equalized so that a true comparison of the difference in the cost of mains of the two materials can be made. It is evident that the cost of installing copper pipe is about equal to the cost of installing steel pipe and that the differences in the installed costs of mains of the two materials are caused by the difference in the cost of the two kinds of pipe.

Most of the steel pipe installed during 1934 was installed bare.

The cost of 3-inch copper pipe shown in Table No. 4 is low compared to the other pipe costs because that pipe was purchased at an earlier date than the others, at a time when the cost of copper was very low.

Economics of Copper Pipe Utilization

The economic factors involved in choosing between steel, cast iron or copper were discussed in the 1932 report. The only revisions to that discussion now required are due to changes in the price of copper or changes in our installation costs.

In general the material should be chosen that will give the lowest annual fixed charges, assuming of course that operating costs (cost of leakage, for example) are the same for all materials.

The ultimate life of copper pipe is not known, but judging from all the evidence we now have, must be very long. However, it is probably not wise to assume a life of more than 30 years. The future of all human affairs is too uncertain to justify looking further ahead than that.

Assuming, then, a life of 30 years for copper pipe and the following comparative prices of steel and copper pipe, it is possible to compute the life that a steel pipe will have to have to give annual fixed charges equal to those for copper pipe.

Cost data to be used in the economic calculations, based on current pipe prices and 1934 installation costs:

MAINS NOT UNDER PAVEMENT

	Dollars Per Foot 2-in.	3-in.
Installed cost of bare steel mains	.593	.829
Installed cost of steel mains protected with two coats coal-tar and one asbestos wrapper	.653	.909
Installed cost of steel mains protected with three coats coal-tar and two asbestos wrappers	.692	.939
Installed cost of copper mains	.825	1.021

ILLUSTRATIVE EXAMPLES

2-in. copper (Installed cost $82.50 per 100 ft.)

Interest .07×$82.50=	$5.78
Depreciation (6% sinking fund) .01265×82.50=	1.04
Taxes .025×82.50=	2.06
	$8.88

2-in. steel—coated with two coats coal-tar and one asbestos wrapper—(Installed cost $65.30 per 100 ft.)

Interest .07×65.3=	$4.57
Taxes .025×65.3=	1.63
	$6.20
Depreciation required to equate fixed charges—	2.68
	$8.88

$\frac{2.68\times1000}{65.3}$ = $41/1000 = depreciation rate

Corresponding life (from tables) = 15.5 years.

MAINS UNDER PAVEMENT

If these mains are installed under pavement costing $.40 per foot to cut and replace, the fixed charges are:

2-in. copper (Installed cost $122.50 per 100 ft.)

Interest .07×122.50=	$8.57
Depreciation .01265×122.50=	1.55
Taxes .025×122.50=	3.06
	$13.18

(Turn to Page 30)

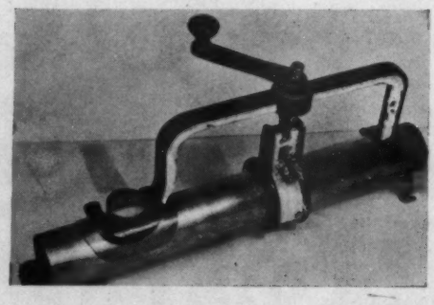
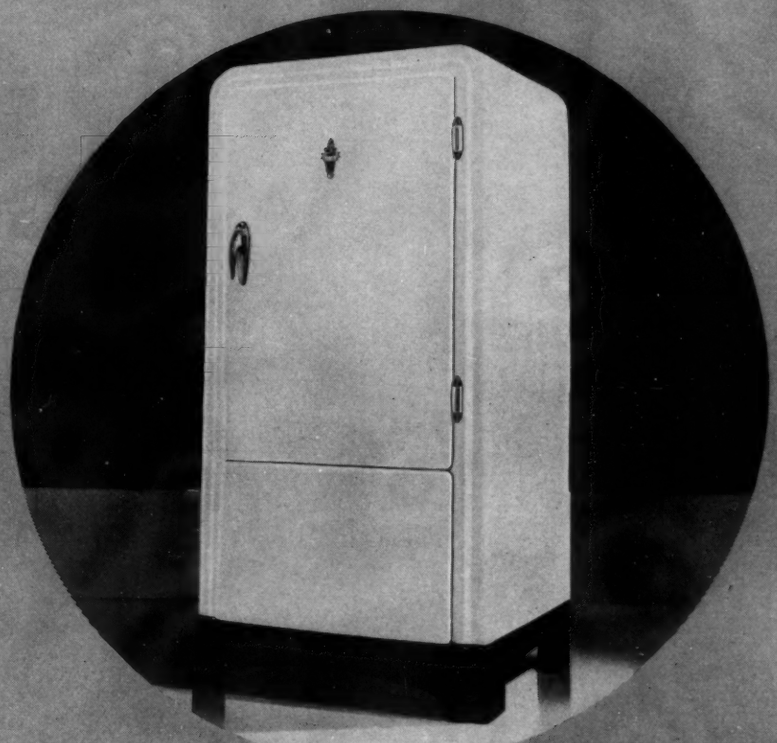


FIG. 9. Clamping stamped copper saddle to main.

GAS REFRIGERATION SALES CONTINUE TO ZOOM!



. . . 1935 Air-Cooled Electrolux wins new friends from coast to coast with its greater beauty, efficiency and convenience

NOW it's certain . . . *this is gas refrigeration's year!* Sales for 1935 are far outdistancing those of 1934 . . . and last year was a record-breaking year. From almost every section of the country come reports of tremendous gains . . . and 1935 is only half over!

The hot summer months ahead provide a valuable opportunity to capture an even larger share of the refrigeration market for *gas* refrigeration. These dog days when families realize more than ever their need for modern refrigeration are the psychological time for your salesmen to talk "Electrolux."

For Electrolux offers families everything other refrigerators offer . . . and more! Its sparkling beauty is winning the hearts of more and more women every day. Its worth-while conveniences set a new high for refrigerator value. And, in addition, Electrolux has those important operating advantages . . . low running cost, permanent silence, no moving parts to wear.

The extra effort which your company puts behind Electrolux during the coming months will repay you many times over. For assistance in forming your sales and merchandising plans, write, wire or phone to Servel, Inc., Electrolux Refrigerator Sales Division, Evansville, Indiana.

NEW *Air-Cooled*
ELECTROLUX
THE SERVEL *Gas* REFRIGERATOR

2-in. steel (Installed cost $105.30 per 100 ft.)

Interest .07×1.053=	$7.37
Taxes .025×1.053=	2.63
	$10.00
Depreciation required to equate fixed charges—	$3.18
	$13.18

$$\frac{3.18\times1000}{105.30}=\$30.20/1000=\text{depreciation rate}$$

Corresponding life (from tables)= 18.6 years.

Conditions Under Which Copper Mains and Services Are Installed

The decision as to whether copper or steel pipe is to be installed in any given case is based upon the results of soil tests made with Shepard earth resistivity meters. These tests are made at pipe depth and at 50-foot intervals along the routes of all proposed main extensions or replacements.

Soil tests are also made by service crews to determine in each case the type of service to be installed.

By means of these tests soils are divided into three classes, according to their electrical resistivity, as follows:

Soil Class	Electrical Resistivity (Ohm/cm.)
I	2,000 or less
II	2,001 to 9,999
III	10,000 or over

The types of pipe and protective coating used in each soil class are given in Table No. 5.

The limitation of 50 lbs. per sq. in. maximum working pressure specified for copper mains and services has been adopted because we have found that under very high pressures, 400 lbs. per sq. in. for example, copper tubes are corroded internally, presumably by traces of hydrogen sulphide in the natural gas. Fifty pounds was adopted arbitrarily and may be lower than necessary.

Construction Methods

A number of improvements in construction methods have been adopted since the publication of the 1932 paper. At that time we had discarded the brazing of copper pipe with Tobin bronze or similar materials containing large amounts of zinc because of the tendency of these materials to dezincify in some soils. We were making all joints with sleeve fittings and soft solder. These soft solder joints often proved defective because of poor workmanship. They are now considered unreliable because of the tendency of such solder to flow under continued stress and to crystallize over a long period of time.

We are now using sil-fos, a silver solder melting at 1,300° F. and containing 80 per cent copper, 15 per cent silver, and 5 per cent flux. This material has proven ideal for our purposes. Its melting point is low enough with respect to that of copper to permit the making of connections to live gas mains without danger of perforating the main. Its tensile strength is nearly as high as that of copper and the absence of zinc eliminates the dezincification problem. We believe that with this material we make joints that are as reliable and as long lived as the copper pipe itself.

Figs. 1 to 8 inclusive show the types of fittings and joints used.

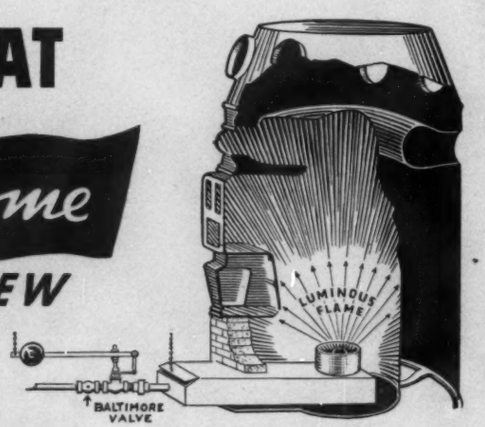
Fig. 1 shows the type of joint used for connecting lengths of pipe. Coupons taken from a joint of this type failed when the stress in the tube was 32,500 lbs. per sq. in. and the elongation in 2 inches was 25.5 per cent. All failures occurred in the sil-fos metal, indicating that the joint is not as strong as the tubing. However, the elongation of 25.5 per cent indicates that the joint is strong enough for our purposes.

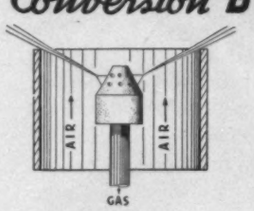
Fig. 2 illustrates a stronger type of joint which can be used for connecting lengths of pipe. One end of each length is belled by heating the copper to soften it and then driving in a tapered steel pin of the proper dimensions. The surfaces to be joined are then cleaned with steel wool, the spigot end is inserted in the bell and the joint is heated thoroughly with an acetylene torch. When the correct temperature is reached a sil-fos rod is applied around the end of the bell. Molten sil-fos is carried to all parts of the joint by capillary attraction. The clearance between the surfaces of the bell and spigot should be from .003-inch to .005-inch to insure satisfactory distribution of the sil-fos.

Fig. 3 illustrates the connection used for connecting copper services to copper mains. All surfaces to be joined with sil-fos are first cleaned with steel wool. The stamped copper saddle is then securely clamped to the main in the manner shown in Fig. 9. The saddle is then heated and sil-fos applied around the outer edge. The navy-bronze cast tee is then sil-fos soldered to the service pipe and to the saddle. The service is then pressure tested, after which the main is tapped in the conventional manner through the opening in the top of the tee with a tapping machine.

Fig. 4 gives the details of a cast navy bronze tee used to terminate copper mains. When it becomes necessary to extend a main, the plug in the top of the tee is removed and a rubber expansion plug is inserted and expanded. With the gas thus shut off the pinched end of pipe can be cut off 8 or 10 inches from the tee and the new extension connected. The 8 or 10-inch distance prevents the melting of the sil-fos joints at the tee. After the extension has been pressure tested, the rubber plug is removed and the bronze plug is replaced. Gas blows to the air during the insertion and removal of the rubber plug; however, no difficulties are encountered on 2-inch mains if the pressure does not exceed 20 lbs. per sq. in., nor on 3-inch mains if the pressure does not exceed 10 lbs. per sq. in. *(Turn to Page 32)*

SELL
GAS HEAT
to the
Small Home
with the NEW
JOHN
ZINK
Conversion BURNER





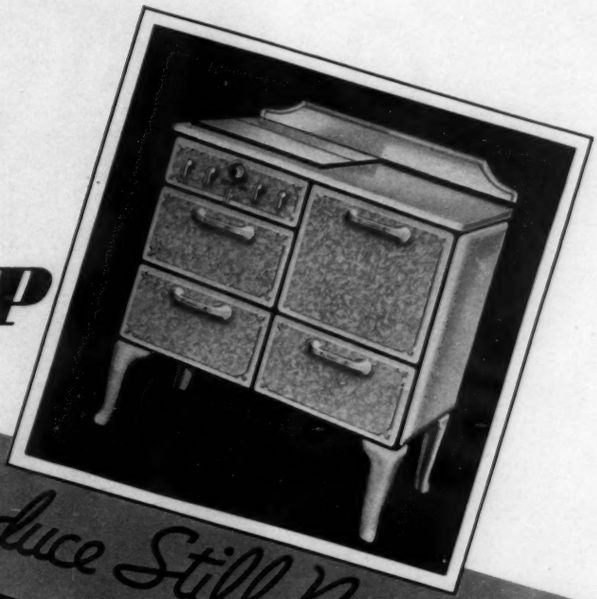
Many gas companies are selling the low-cost John Zink Conversion Burner to the small-home owner and the renter. Overcome the "first-cost" sales obstacle with this burner.

Check These Points

Manually Controlled in the Basement—Chain-Controlled From the Living-Room—or Fully Automatic With Customary Controls. (Thermostatic Equipment If Desired.) Easily Installed—Eliminates "Cold 70"—Burns either natural or manufactured gas! Write to:

JOHN ZINK BURNERS • TULSA, OKLAHOMA

To provide a more complete and better SALES SET-UP



We Now Introduce Still Newer

DETROIT JEWEL AND GARLAND Gas Ranges

THESE latest Detroit Jewel and Garland gas ranges embody all the features that have met with widespread approval everywhere. In addition, they offer a combination of price and quality that fills a sales need not heretofore offered by any other manufacturer of gas ranges.

The immediate and general approval given to our promotional numbers leads us to believe these new Detroit Jewel and Garland Gas Ranges will prove to be sensational sales getters whenever and wherever displayed.

We urge you to order your samples right away. We know your gas range business will show a gratifying and profitable increase.

. . . to meet popular price demand

INCREASE YOUR SALES WITH THESE SALES GETTERS!

Nowhere can be found gas ranges that have more advertising and sales advantages than these new Detroit Jewels and Garlands. Built to fit 36 inches of floor space, they are really big gas ranges in every detail.

Possessing all the structural features of our famous junior line, such as the one-piece oven (20 inches deep) with rounded corners, removable oven tray, and many others, these gas ranges can be retailed at a price that is amazingly low for products of such quality. Made in three color trims: plain white, ivory and tan, and ivory and green.

DETROIT-MICHIGAN STOVE CO.

Detroit, Michigan

Figs. 5 and 6 show the fittings used to connect copper services to steel mains. Silfos cannot be used to connect copper to steel; therefore Tobin bronze or an equivalent brazing material is used. A protective coating is applied to the main, the service nipple and the copper service at these connections, as a precaution against localized corrosion of steel within 2 or 3 inches of the connection and dezincification of the bronze.

Fig. 7 illustrates the adapter used to connect copper tubing to standard pipe thread valves or fittings. These are used, for example, at the top of a service riser where connection is made to a service cock.

Fig. 8 illustrates the type of elbow used. A variety of fittings of this type are on the market.

Conclusions

The conclusions in the 1932 report that still appear to be valid have been stated above. The following additional conclusions can now be drawn:

1. Copper pipe is a suitable material for submarine crossings and salt marsh installations, as well as for installations in corrosive soil. (A revision of conclusion No. 2 of 1932 report.)

2. The accelerating effect of iron oxide on the corrosion of copper in soil is not enough under our field conditions to warrant the discontinuance of the practice of using old steel pipes for conduits where savings in installation cost are effected by such use.

3. Sil-fos solder joints are more satisfactory for our purpose than soft solder joints. (A revision of conclusion No. 10 of 1932 report.)

4. The installed cost of copper services is so nearly equal to the installed cost of wrapped steel services that the use of the former is justified in all localities where the soil is too corrosive to permit the use of bare steel. (A revision of conclusions No. 13 and No. 14 of 1932 report.)

5. It is economically sound at now existing prices to use 2-inch and 3-inch copper mains in soils where the life of wrapped steel is less than 15.5 years if the main is not under pavement, and less than 18.6 years if the main is under heavy pavement. (A revision of conclusions No. 13 and No. 14 of 1932 report, made necessary by changes in the price of copper.)

Diversified Gas Exhibits at Housing Show in Portland, Ore.

Featuring an all-gas kitchen and laundry room including gas ranges, refrigerators, water heaters, washing machines, ironers and clothes driers, the Portland Gas and Coke Co. in cooperation with appliance dealers exhibited more than $20,000 worth of gas appliances at the national housing show in Portland, Ore., May 25 to June 2. A spectacular exhibit of a battery of four 3,000-candle power gas flood lamps was located above the auditorium entrances. In the all-gas kitchen a home economist was on duty demonstrating the appliances.

Adjustable External Lights Patented by Inland Mfg. Co.

INLAND Manufacturing Co. of Chicago, manufacturers of gas heating specialties, has just secured patents on its adjustable external lighter designed for the conversion burner or gas-designed heating apparatus.

Installation of the lighter is easily made and requires only the cutting of a 1⅛-inch hole with a circular saw and two ¼-inch drillings in the burner front. The lighter tube and shield can be installed at various angles and adjusted to exact position. The lighter flame can be directed to any angle within 120° by turning lighter tube or lighter spud.

In the case of the gas cock, all gas is controlled by the one device and when it is in the "closed" position, the burner, pilot and lighter are off. In the "start" position, pilot and lighter are on, the burner is off. In "open" position, the pilot and burner are on and the lighter is off.

In the operation of the cock, gas to the pilot must be turned on first. A secondary operation is necessary before the gas can be turned on to the burner. It is impossible to use the lighter with gas passing to the burner. Directions and warning are cast on a 5½-inch lever handle and on the spring catch.

Distribution of the products is made through the Chicago headquarters of the company and the A. Y. McDonald Mfg. Co., Dubuque, Iowa.

Oklahoma Natural Gas Co. Granted Oklahoma City Franchise

As a result of the June 28 Oklahoma City election, the Oklahoma Natural Gas Co. was granted a 25 year franchise by a vote of 6,974 to 4,732. Following the election the company announced that improvements amounting to $200,000 would be made in its Oklahoma City property. The only campaign effort by the company consisted of a series of newspaper advertisements pointing out that no city in the United States as large or larger than Oklahoma City enjoys such low gas rates.

The new franchise levies a city tax of 2 per cent on gross receipts and provides that the city shall have the opportunity every five years to purchase the property.

Atlas Corp. Acquires Harley Clarke Utility Interests

Through acquiring common stock of Public Utilities Securities held by the RFC, the Atlas Corp. has secured control of the Harley Clarke utility interests, chief of which is the Utilities Power & Light Corp. The RFC acquired the stock through notes held by the Central Republic Bank and Trust Co. against which the entire common stock of Public Utilities Securities was pledged. RFC had held control of the utility stock for about four months. In disposing of its stock it caused the resignation of directors that it had elected to the board. Fred B. Odlum is president of the Atlas Corp.

Lone Star Connecting Two Gassers

Lone Star Gas Co., Dallas, Texas, is laying a line from its Long Lake trunk line to two gassers of 50,000,000 cu. ft. capacity each, of the J. B. Daniel Oil Co., near Red Lake in Freestone County.

NEMEC
COMBUSTION
EQUIPMENT

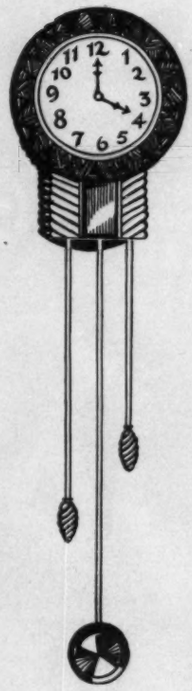
INCLUDES Burners and Controls for all Domestic conversions, Arcolas, Heating and Power Boilers, Bakers Ovens, Kilns, Dryers and every possible conversion, commercial, and industrial requirement. Over 50 types of burners.

Controls for power and heating boilers.

NEMEC EQUIPMENT IS USED ALL OVER THE WORLD, WHEREVER NATURAL GAS IS USED FOR FUEL

RELIABLE DISTRIBUTORS WANTED

NEMEC combustion ENGINEERS
WHITTIER — CALIFORNIA.

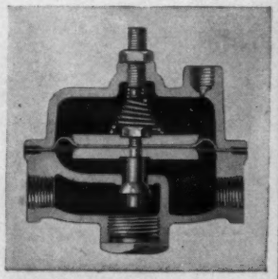


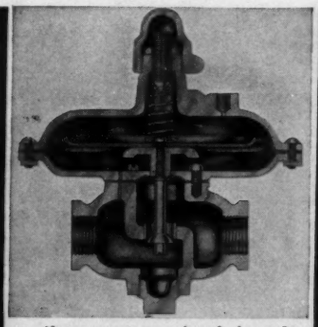
'ROUND THE CLOCK AGAIN AND AGAIN

Reynolds Guarantees Unexcelled Performance

REYNOLDS Low Pressure Regulators guarantee unvarying delivery pressures, sharp response to changing load demands and positive control of small volume, low pressure gas flow at outlet even though inlet pressure and volume vary. As is true of all REYNOLDS Regulators, these units are rugged, built of quality materials, and balanced to give more than the maximum through a wide range of operating conditions. REYNOLDS offer complete, co-operative service of their Engineering Department in working out Gas Control problems. Write for details.

Below, a cross-sectional view of R-10070-El.





Above, a cross-sectional view of Low Pressure Regulator.

Reynolds Branch Offices:
421 Dwight Bldg.
Kansas City, Missouri

2nd Unit, Santa Fe Bldg.
Dallas, Texas

Representatives:
Eastern Appliance Co.
Boston, Mass.

F. E. Newberry
Avon, New Jersey

G. H. Unkefer
428 Boyd St.
Los Angeles, Calif.

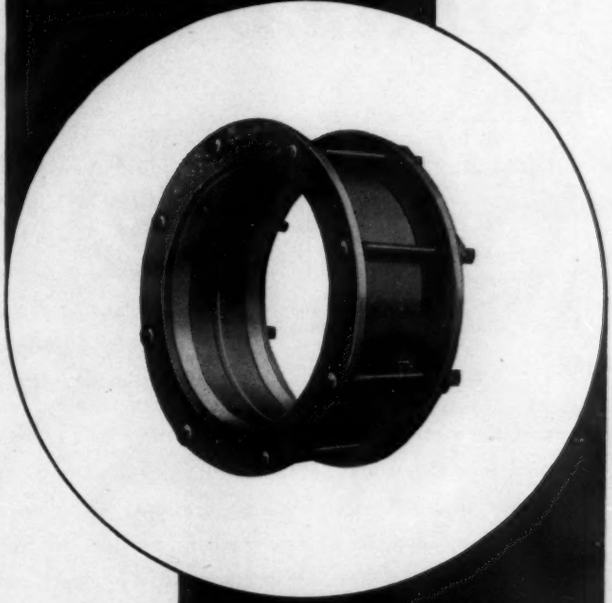
Regulator R-10016-El, was designed for use on automatic gas stoves and affords an unusually compact installation. It is similar in design to R-10070-El but of greater capacity. Recommended for maximum inlet pressure of one pound reducing to inches W. C.

Regulator R-10070-El, a member of the R-10070 Series, primarily designed for use on gas refrigerators, but unbeatable for any installation where accurate pressure control of small volume is required.

REYNOLDS GAS REGULATOR CO.
ANDERSON, INDIANA, U. S. A.

GAS CONTROL SINCE 1892

A DAYTON COUPLING



IS
PERMANENT
DEPENDABLE
ECONOMICAL

Illustrated is the No. 1 All-Steel Coupling.

Styles and sizes for every pipe line requirement.

THE NATIONAL-SUPERIOR CO.
DAYTON PIPE COUPLING DIVISION
Dayton, Ohio

RELIANCE REGULATORS

insure absolute control of

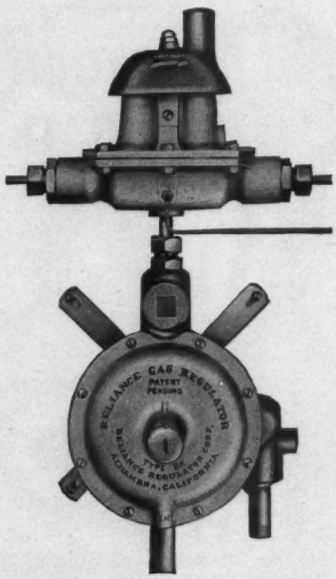
BOTTLED GAS FUELS

When you specify Reliance Regulators for liquid petroleum gas service you are specifying regulators that have been thoroughly tested and approved in both laboratory and field service. For butane, propane and mixed gas control, Reliance Duplex Operating Type Regulators give maximum satisfaction.

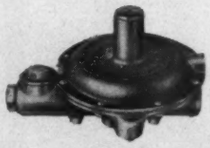
One of the most popular installations is the "MR" Primary Regulator used in conjunction with either a Type "B" or "BK" Secondary Regulator. The Primary "MR" Regulator reduces extremely high pressures encountered in the service cylinder when first installed, to an intermediate pressure of from 3 to 10 lbs. The "BK" Regulator then reduces this pressure to a uniform outlet pressure required for proper utilization to insure uninterrupted service to the appliances.

Reliance Type "B" and "BK" Regulators are separate units that can be used individually as single step reducing regulators with the use of manual controlled valve. These regulators are equipped with brass inlet valves, composition valve seat discs and diaphragm, insuring long life, sensitive regulation and immunity to temperature conditions. Both regulators have detachable valve seats and may be readily inspected or changed. A proven and positive pressure safety relief device is used on these regulators. It is the Reliance standard type mercury seal superior to either weight loaded or diaphragm type. The collector type mercury seal practically eliminates any possibility of mercury loss and can re-seal after a momentary blow. Internal mechanical relief valves can be furnished where required.

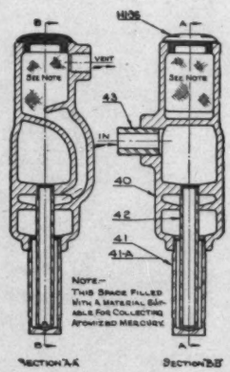
Write for Bulletin No. 30 explaining in detail all types of Reliance Regulators and accessories designed for automatic control of bottled gas fuels.



Above is illustrated a Type "MR" spring loaded primary regulator with a Type "BK" secondary regulator. The "BK" is equipped with brackets and mercury seal. Patent No. 1,960,-466.



Side view of Reliance Type "BK" Regulator, which may be used either as a single step reducing regulator or as a secondary installation.



Cutaway section of the Reliance Special Collector Type Mercury Seal. Will re-seal after momentary blow.

REGULATORS YOU CAN RELY ON — RELIANCE — SINCE 1910 — TRADE MARK

Reliance Regulator Corp.

1000 Meridian Ave., Alhambra, Calif.

RELIANCE REGULATORS

BUTANE-PROPANE NEWS

Substituting Butane-Air on Small Manufactured Gas Properties

J. A. WARD, president of the Republic Electric Power Corp., brought to the July Northwest Conference of the Pacific Coast Gas Association at Tacoma, Wash., an account of his company's experiences in converting several oil gas properties to butane-air gas service. The September, 1934, issue of *Western Gas* covered some phases of the changeover at Needles, Calif., also described to the Tacoma group by Mr. Ward; a summary is given below of material brought out in the Northwest Conference discussion, not reported in the earlier issue.

In place of the 550 B.t.u. oil gas formerly served to Needles' 450 customers it was decided to serve 900 B.t.u. butane-air, and the new gas was instituted on June 13, 1934, with no adjustment of customer's appliances. At the suggestion of the California Railroad Commission, billing was changed from the cubic foot basis to the therm basis, following experiments with 50 representative meters which indicated that total B.t.u. consumption would remain relatively constant. The total send-out for last year was about 50 per cent butane-air gas and 50 per cent oil gas. The year 1933, of course, was all oil gas service. It is interesting to note that revenue per customer for the years 1933 and 1934 checks within 4 cents, indicating that rewriting the old rates on the therm basis was entirely equitable to consumers. It also demonstrates that in the Needles situation changing B.t.u. content of the gas served without changing appliances has not affected the B.t.u. consumption.

The chief difficulty experienced with butane-air at the Needles plant was caused by sulphur and sulphides picked up by the butane from high pressure gas storage tanks formerly used in oil gas service. This sulphur dropped out at the point where the butane changed to the vapor form. In changing over its recently acquired property at Ashland, Oregon, the company eliminated this trouble by applying aluminum paint to the inside of the old gas tanks.

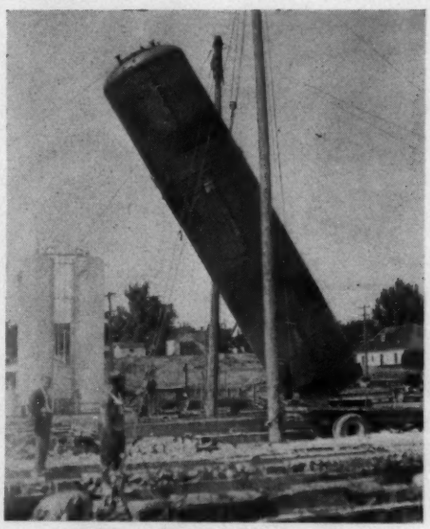
Leakage on the Needles' distribution system in the early stages of the changeover was very high, due to the fact that the system was laid more than 20 years ago, and with second hand pipe. When the Republic Electric Power Corp. took over the plant in 1930, gas loss was as high as 60 per cent, which had been reduced to 30 per cent by a program of reconditioning prior to the changeover to butane-air. After the tar and deposits had been dried out by the butane-air, the system began to leak badly, unaccounted-for during the first month of the new gas going as high as 80 per cent. Odorizing with ethyl mercaptan and locating leaks was started at once, with the result that unaccounted-for is down to 24 per cent, and the company expects to reduce it to 15 per cent.

The system is now being fogged with tetralin and also with a special fogging oil. This has not been done sufficiently long to determine what effect it will have on the unaccounted-for, but it has eliminated dust troubles which were arising. In the company's opinion a great many pin-hole leaks which developed when butane was introduced would have been eliminated had fogging been adopted before going to butane, as the fogging oil would have effectively sealed these with a plug of dust, rust and oil. Ashland, Oregon, and several other Oregon systems acquired from the Southern Oregon Gas Corp., are now being fogged. The system at Ashland has been in operation on butane-air for six weeks, and unaccounted-for losses have not increased from their previous average of 20 per cent.

Commenting on generating costs, Mr. Ward stated that the cost per M cubic feet generated at Needles for May, 1935, compared with May, 1934, was reduced 51 per cent through substitution of butane-air gas.

In its present program of converting the plants at Ashland, Medford, Roseburg and Grants Pass, Oregon, to butane-air Mr. Ward's company is finding numerous ways to simplify the operation. In one town of 12,000 population Gasair machines have been located at five advantageous points throughout the distribution system. Distribution pressures, formerly 10 pounds, have been reduced to 1½ pounds by piping liquid butane from the storage tanks through copper tubing to the Gasair units, which make butane-air gas into the system at a pressure of 1 pound. Line pressures and line losses have thus been reduced and better service rendered than with the former higher pressure.

More Storage for Butane Bus Fuel at Spokane



New butane storage tank going in for Spokane United Railways.

SPOKANE United Railways last month completed installation of an additional 25,000-gallon butane storage tank, together with an auxiliary loading stand and dispensing equipment for filling fuel tanks of the buses operated by the company.

Initial installation of butane storage was made by the company some months ago when two 12,500-gallon tanks and a dispensing unit went in. In January 10 buses were changed over to butane service and in all the company has ordered equipment for change-over of 64 individual buses. In addition, 12 new buses will also be changed over completing the program for putting the entire Spokane bus service on butane fuel.

Space for another 25,000-gallon tank has been provided for later use. Parkhill-Wade, Inc., of Los Angeles has been handling engineering details in connection with the Spokane bus system conversion and installation of storage and dispensing facilities. The new unit was completed early in July.

Committee on Bottled Gas Appliance Efficiencies

A joint committee of the National Bottled Gas Association and the Compressed Gas Manufacturers' Association has been formed to develop standards for increasing the efficiencies of bottled gas appliances. The work will be carried on in conjunction with the American Gas Association testing laboratories at Cleveland, Ohio.

The chairman of the committee is M. G. Farrar, Pyrofax Division of Carbide and Carbon Chemicals Corp., New York, N. Y. Other members are: K. C. Waldo, Cumberland Fuel Co., Cincinnati, Ohio; W. G. Watkins, Skelly Oil Co., Kansas City Mo.; E. G. Richardson, Shell Petroleum Co., St. Louis, Mo.; K. R. Lewis, Philgas Department of Phillips Petroleum Co., Pontiac, Mich.; W. G. Oliver, Standard Oil Co. of California, San Francisco, Calif.

PREFERRED
BY THE LEADERS

When time and again Hackney Liquefied Petroleum Gas Cylinders are chosen by the leaders in the field, it becomes evident that they are the wise answer.

So powerful has Hackney become in the liquefied petroleum gas field that there are *two* Hackney cylinders in service to all others combined.

Hackney customers include: Shell, Standard, Skelly, Hope, Phillips, etc. And users of Hackney cylinders for other gases include: Mathieson, Virginia Smelting, R. & H. Chemical, Air Reduction Sales, etc.

Back of Hackney cylinders lies the long and wide experience of Pressed Steel Tank Company—designers and manufacturers of metal containers for leading industries.

PRESSED STEEL TANK COMPANY
208 S. La Salle St. Bldg., Room 1185, Chicago, Ill.
1363 Vanderbilt Concourse Bldg., New York, N. Y.
6633 Greenfield Ave., Milwaukee, Wis.
666 Roosevelt Bldg., Los Angeles, Calif.

Hackney
MILWAUKEE

CONTAINERS FOR GASES. LIQUIDS AND SOLIDS

BUILD YOUR HOUSEHEATING LOAD
WITH KLIXON CONTROLS

These two advanced Klixon devices give exact automatic temperature control and assure positive pilot protection for your gas-fired space heaters . . . provide sales features that make it easy to sell gas heating.

Write today for descriptive bulletins.

SPENCER THERMOSTAT COMPANY
Unit of Metals & Controls Corporation
34 FOREST STREET • ATTLEBORO, MASSACHUSETTS

N. B. G. A. Sponsoring Two West Coast Meetings

TWO general meetings for the discussion of bottled gas problems will be held on the Pacific Coast during the latter part of August. They are to be convened under the auspices of the National Bottled Gas Association, with H. Emerson Thomas, the Association's president, presiding.

The first meeting is scheduled to take place at the Palace Hotel, San Francisco, Calif., at 1 p. m., August 21. The second will be at the Biltmore Hotel, Los Angels, Calif., at 1 p.m., August 23.

Invitations to attend have been sent to bottled gas marketers, producers, and equipment and appliance manufacturers located west of the Rocky Mountains. It is expected that many attending the Los Angeles meeting will take advantage of the opportunity to include on their itinerary a visit to the San Diego Fair.

The purpose of the meetings, the first to be held on the Pacific Coast under the auspices of the National Bottled Gas Association, is to permit general discussion of various problems of the liquefied petroleum gas industry, such as marketing, appliance efficiencies, advertising, distribution, load-building, competitive fuels, etc.

Membership in the National Bottled Gas Association is not required for attendance at the meetings, and there will be no registration fee. Those planning to be present are requested to advise the National Bottled Gas Association, 11 West 42nd Street, New York City.

Omaha Utilities District Heating Campaign

Under the direction of W. J. Barber, assistant general manager, and Frank Landers, sales manager, the Metropolitan Utilities District at Omaha, Neb., procedure for a heating campaign for the current year has been completed. From 14,000 circulars sent out, 100 inquiries have already been received, and a crew of five salesmen is now canvassing these prospects.

Harbour-Longmire Co. of Okla. Appointed Dealer for Ward

Ward Heater Co. of Los Angeles, manufacturer of the Ward floor furnace, has appointed the Harbour-Longmire Co., with headquarters in Oklahoma City, as its distributor for the State of Oklahoma. The Harbour-Longmire Co., distributor for Electrolux and other gas appliances, has 250 dealers throughout Oklahoma.

Sales Engineer Seeks Connection With Butane-Propane Marketer

A sales engineer with 12 years experience, grounded in an early training in mechanical engineering, desires to become associated with a company producing and marketing liquified petroleum gas. He is prepared to go anywhere in the United States, and offers references. *Western Gas* will be glad to forward any inquiries to the applicant.

Col. Burrell Awarded Lamme Medal for Engineering Achievement

COL. GEORGE A. BURRELL of the Burrell-Mase Engineering Company, of Pittsburgh, Pa., and Tulsa, Okla., has received the Lamme Medal from Ohio State University for outstanding achievement in engineering.

Col. G. A. Burrell

Colonel Burrell is a graduate chemical engineer from Ohio State University and holds the honorary degree of Doctor of Science from Wesleyan University, Conn. During the War, he was in charge of research and development work for the Army and Navy. He located the helium supply, in Texas, for the United States Government in 1917, and initiated the Government helium program.

The U. S. Army gave him the distinguished service medal. In 1929-31 he was in Russia helping the Soviet Government modernize its gasoline and natural gas industries. His company has built many natural gasoline plants, liquid gas plants, vapor recovery plants, pressure distillate stabilizers, and the like, for the natural gasoline, gas, and refining industries.

R. L. Hayden Made Manager Coast Counties Northern Division

R. L. Hayden was transferred to the Northern Division of the Coast Counties Gas and Electric Co., Santa Cruz, Calif., as manager, effective June 1, 1935. He succeeded Pierre Vinet, who has resigned from the company to return to the middle west, where he was connected with the utility business for a number of years before coming to the Coast Counties Gas and Electric.

Mr. Hayden has been district manager for the Natural Gas Corp. of California, an affiliated company, in the Imperial Valley for the past four years. Previous to that time he worked as sales supervisor for that organization in the Vacaville, Suisun, Fairfield and Rio Vista properties of the company, at the time gas service was first inaugurated in the area. Mr. Hayden will make his headquarters at Martinez.

New Phoenix Headquarters for Nemec Distributor

Nemec Engineering and Supply Co. of Phoenix, distributors for Nemec combustion equipment in Arizona, has moved to its new location at 530 W. Adams St. The new location provides twice the floor space of the former one, which was outgrown in a year of activity since natural gas was introduced. The company handles a full line of burners and heating equipment. All except a few industrials in Phoenix are now using natural gas.

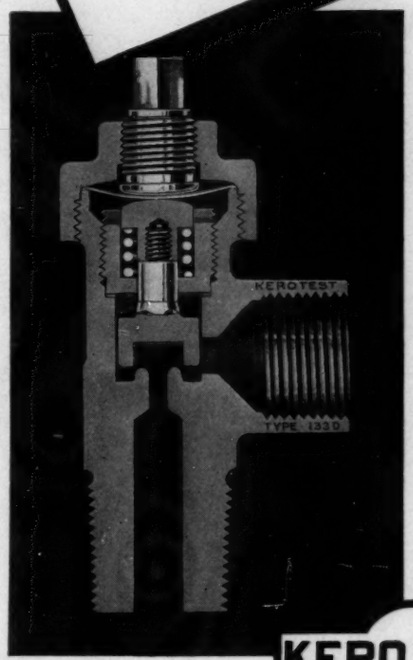
Rushville Butane-Air Plant Opened

Rushville, Ill., put its new municipal butane-air plant into operation early in July.

KEROTEST

PROPANE CYLINDER VALVES

DIAPHRAGM PACKLESS



EXCLUSIVE features make Kerotest Diaphragm Packless Valves ideal for propane gas service . . . the one and only valve that can be inspected and serviced while under full pressure "on location" and without removing the valve from the cylinder.

It is equipped with a heavy stainless steel spring which reciprocates the movement of the handwheel.

The patented non-rotating spindle eliminates wear at the seat and provides a pressure-tested metal to metal backseat when the stem is in full open position. Available in Type 133A with handwheel—POL female L.H. Outlet. Type 133D without handwheel—POL female L.H. Outlet. Listed as standard by underwriter Laboratories—meets Bureau of Explosives Specifications.

Investigate this outstanding Kerotest achievement in valve design TODAY! Write for descriptive literature.

KEROTEST

KEROTEST MANUFACTURING CO.

PITTSBURGH, PENNSYLVANIA

Compressed Gas Supplied for Railway Restaurant Cars

FOR over a year Corporation Gas Works, Belfast, Ireland, has been supplying compressed gas to the Great Northern Railway Co., Ltd., for cooking in restaurant cars. James D. Smith, engineer and manager for the gas company, supplies the following details to *Western Gas.*

The gas is compressed to 3,000 pounds per square inch pressure, using a 2-crank, 6-stage, 6-cylinder engine which delivers 100 cubic feet of free gas per minute at 5,000 pounds pressure.

The compressor is driven by a 65 b. h. p. electric motor and runs at a speed of 375 r. p. m. The compressor is automatically controlled so that when the pressure in the storage cylinders reaches 5,000 pounds per square inch the gas is automatically cut off.

The gas is stored at 5,000 pounds pressure in two steel cylinders approximately 21½ inches in diameter, by 11 feet 6 inches long by 1¼ inches thick. From these storage cylinders it is filled, through a special valve, into smaller service cylinders of about 2 cubic feet water capacity with walls about ¼ inch thick; the pressure in these cylinders being 3,000 pounds. Cylinders are brought daily by the railway company to the gas works for charging, and are then coupled up to the restaurant cars.

MEASUREMENT and CONTROL

Design and Application of Pressure Elements

By VIRGIL E. SCHULTZ
Sales Engineer
The Foxboro Company*

THE measurement of static pressures has been practiced by man for many centuries. Crude pressure measuring devices have been found which were used by the ancient Romans in connection with their famous old aqueducts. Today, more than ever before, the correct measurement of pressure is of primary importance to modern industry. In the gas and oil industry especially is this true. Not only is correct pressure measurement an economic necessity, but human life actually is dependent upon the accurate functioning of the pressure gauges which so many of us take for granted. Accurate pressure gauges are, therefore, much more important than accurate meters, for without accurate pressure measurement our gas meters would be useless anyway.

Virgil E. Schultz

In keeping pace with industry, the design of modern pressure measuring instruments and the materials used in their manufacture are necessarily quite different from those of 20 years ago. Metallurgists have provided us with new alloys and new methods of heat treatment, which greatly increase the life and efficiency of present day gauges.

The purpose of this paper is to touch briefly on the construction of pressure measurement instruments.

Pressure measuring devices may be divided into three groups, as nearly all methods of measuring pressure will fall into one of the three general classifications.

First, the manometer or U-gauge group. We are all familiar with many of the different forms and applications of manometers, so no further comment will be made here.

Second is the dead weight tester, which is actually a modified manometer, because in principal a known weight is balanced against an unknown pressure, which is exactly what is done with a manometer when it is used to measure pressure. The fluid pressure scale is another form of the dead weight tester.

The third group embraces the so-called spring type gauges. It is this group that will receive the most comment in this paper, as nearly all the gauges we use fall within this classification. The different designs of spring type gauge movements for recorders will be considered in order, from those for lowest working pressures up to the highest. The recommendations herein contained have been made after much thought and consideration, influenced by years of observation of the failures and successes of gauges of various designs.

For partial vacuum, pressure and compound vacuum, and pressure ranges equivalent to less than 8 pounds, the diaphragm type is recommended (See Fig. 1). This is a series of metal diaphragms built up to form a bellows with small coiled restraining springs on one side. This multiplies the motion of the other side and prevents side motion of the diaphragm. This construction gives a rugged compact element, which responds promptly and accurately to minute pressure changes. For ranges equivalent to more than about 8 pounds, the wall thickness of the diaphragms must necessarily be increased, thus decreasing accuracy and responsiveness.

An interesting sidelight may be mentioned at this time regarding buttons. Buttons are accepted by all of us as a matter of fact, although they actually play a major role in our lives. In addition to holding up the nation's pants—now that suspenders are back in vogue—and being conveniently located in the center of your steering wheel to push on when you want to make a noise, buttons actually gave birth to the idea which has developed into the diaphragm type element. Benjamin H. Bristol—the father of E. H. Bristol, president of the Foxboro Co.—was at one time the superintendent of a New England factory, which manufactured buttons. Some of these buttons had a filling and were covered by a thin metallic shell. About 1891 or 1892, Mr. Bristol simply took the idea of these button shells with a hole in the center and fastened them together into the old original diaphragm element with a restraining strip on the side of it.

The present improved form of diaphragm movement first described was designed by E. H. Bristol and his brother, B. B. Bristol, at Foxboro about 1910. They realized that the large capacity of the old diaphragm element made it subject to terrific momentum in addition to being subject to temperature correction, so they cut down the number of tubes and, instead of using the flat restraining strip, they used phosphor bronze helical springs. Retaining the side in this manner gave plenty of movement from the other side of the tube and made a much more satisfactry movement in a smaller space, permitting the use of round form cases.

For partial vacuum, pressure and compound vacuum and pressure ranges equivalent to 8 pounds and up to 15 pounds, the bronze spiral type of construction has been found to be quite satisfactory (See Fig. 2). This spring is made from flat elliptical tubing, the walls of which are made thick enough to prevent ruptures, and the number of turns or coils great enough to allow suffi-

*Presented before the Southern California Meter Association.

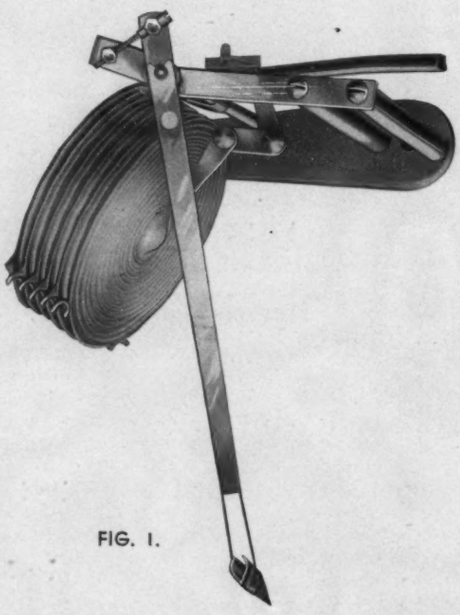


FIG. 1.

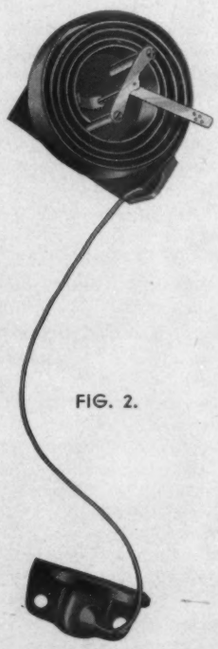


FIG. 2.

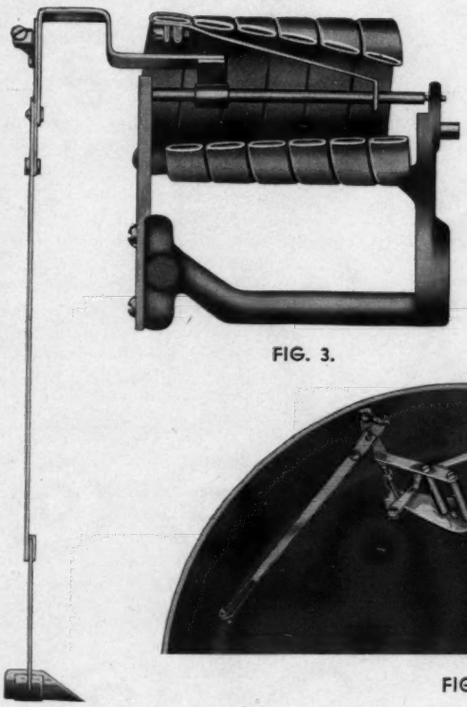


FIG. 3.

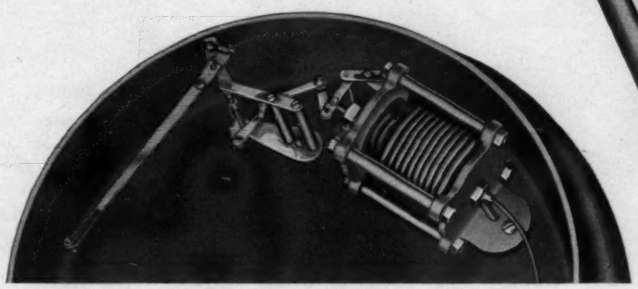


FIG. 4.

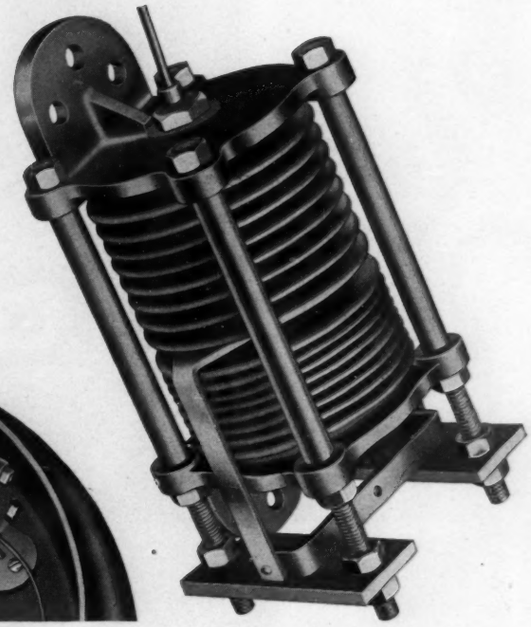


FIG. 5.

cient movement of the inside coil, which is linked to the recording mechanism.

The next type of element is the bronze helical, invented by E. H. Bristol and first put into use about 1891 (See Fig. 3). Its use is recommended for full vacuum, pressure and compound vacuum, and pressure ranges equivalent to from 15 to 200 pounds. It may be used up to 500 pounds, but the next type has been found to be more satisfactory for pressures above 200 pounds.

For all pressure ranges from 200 pounds to 2,000 pounds the alloy steel helical is most satisfactory (Fig. 3). This element may be used up to 4,000 pounds. For high pressures safety demands the use of this type of construction with welded connections throughout. The alloy steels used in these elements are carefully heat treated to secure maximum fatigue resistance and correct elastic properties.

Steel bourdon tubes may be used from 2,000 to 4,000 pounds and must be used for pressures higher than 4,000 pounds (See Fig. 5).

When measuring the pressure of gases or liquids corrosive to bronze, steel construction should be substituted.

For ranges up to 22 pounds requiring more than 33 per cent over-range protection, or suppressed scale ranges requiring more than 40 per cent suppression, the bronze hydron construction is recommended (See Fig. 4). The hydron or bellows is formed of bronze alloy tubing by a hydraulic process that assures uniform wall thickness. The hydron is subjected to the pressure to be recorded and is restrained by a steel spring. Even the low range hydrons may be subjected to pressures of 35 pounds without injury.

For the accurate measurement of absolute pressures a double hydron element is used (See Fig. 5). One hydron is evacuated and sealed. This hydron moves with changes in barometric pressure and restrains the movement of the other hydron, which is subjected to the pressure to be measured. This action results in a pen movement recording true absolute pressures.

In the design of pressure measuring devices, such as those just described, many phases and angles enter into the picture which the designer must consider, and any one of which will affect the ultimate result. What metals and alloys shall be used? Shall they be soldered, welded or brazed? How about heat treatment? How shall the motion be transmitted to the pen arm? Will multiplication of movement be necessary? Friction, fatigue, temperature coefficient, ease of calibration, interchangeability, accessibility and ultimate selling price are a few of the factors which must be considered.

In concluding, the writer would like to mention a point which applies not only to pressure gauges but to practically all recording and indicating instruments. When deciding what instruments to specify for a given installation, remember that you are choosing a *measuring* instrument. The only work required of it is to move a light pen or pointer. Any work added to this by heavy parts, friction or inertia decreases the accuracy. Construction should fit the purpose. Not only is "heavy" construction unnecessary, but it interferes with the accurate operation of the gauge.

Varied Program Offered at S. C. M. A. July Session

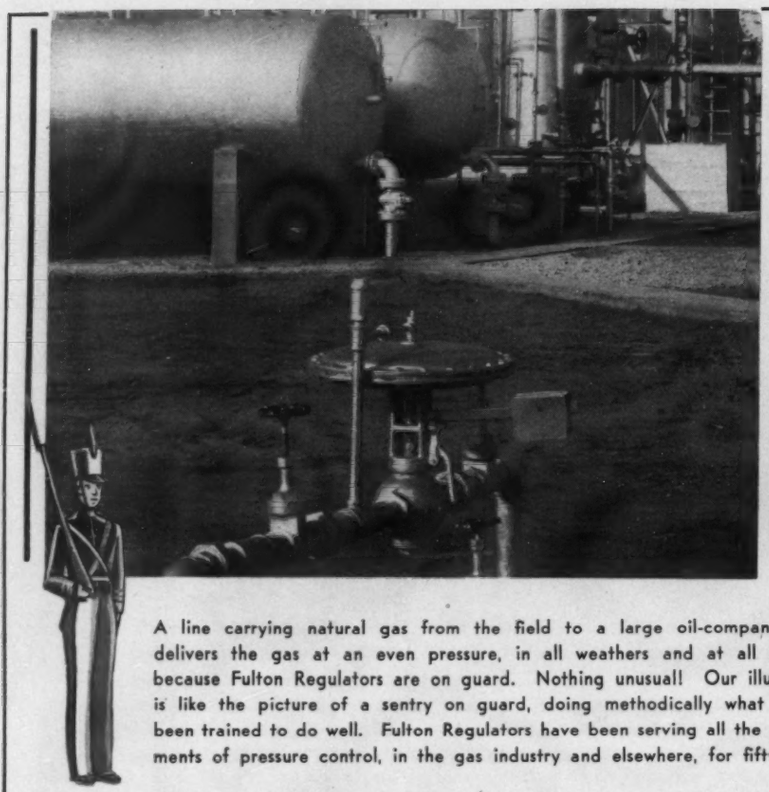
PRESIDENT F. E. BRADLEY called the Southern California Meter Association into session for its first meeting of the new fiscal year on July 25, at Lakewood Country Club, Long Beach, Calif.

The first feature on the speaking program was a discussion of progress in use of standard gas samples, by Guy Corfield of the Los Angeles Gas and Electric Corp., who is vice-president of the Association this year. Mr. Corfield a year or more ago introduced the subject of using standard gas samples before the Association, and a resolution recommending the practice was passed at that time. The present discussion was a progress report summarizing the experience with the standard gas during the past year. Use of the samples has been of considerable service in routine checking of instruments and adjustment of apparatus having to do with specific gravity and calorific value determinations, and the Association was urged to set up a procedure through its Standards Committee for general use of the gas.

Second on the program was an interesting review of modern refrigeration, by H. W. Geyer of the Southern Counties Gas Co. Commenting briefly on the history of early refrigeration, Mr. Geyer proceeded to cover both compression and absorption refrigerating cycles, the various refrigrants employed, and practical problems met by the gas industry in bringing the gas refrigerator to its present high state of perfection.

C. B. Heartwell, member of the committee of west coast associations which has in hand the development of procedure for using the new A.G.A.-A.S.M.E. orifice meter data, reported briefly on the committee's work. He stated that all computations are now virtually complete and the report is being assembled in form for approval.

President Bradley announced that the August meeting would be held on the fifth Thursday, August 29th, instead of the usual fourth Thursday, the meeting place to be Lakewood Country Club.



ON GUARD!

A line carrying natural gas from the field to a large oil-company plant delivers the gas at an even pressure, in all weathers and at all seasons, because Fulton Regulators are on guard. Nothing unusual! Our illustration is like the picture of a sentry on guard, doing methodically what he has been trained to do well. Fulton Regulators have been serving all the requirements of pressure control, in the gas industry and elsewhere, for fifty years.

The Chaplin-Fulton Manufacturing Company
28-40 Penn Avenue Pittsburgh, Pa.

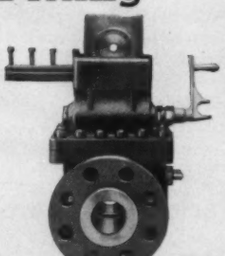
DANIEL Orifice Fitting
"KETTLEMAN" TYPE

You Can Change Plates with *Absolute Safety* at Pressures Up to 2,000 Pounds

The "Kettleman" Type incorporates all the safety and convenience features which have been tried and proven in hundreds of DANIEL installations throughout the oil and gas industries. With the use of a single wrench, plates can be changed quickly, without shutting off pressure in the line. Eliminates the expense of a by-pass. Works equally well on air, steam, dry gas, wet gas, or corrosive gas.

Write for latest bulletins describing "Kettleman," "Senior," and "Junior" Type Daniel Orifice Fittings, in all sizes and pressures.

DANIEL ORIFICE FITTING COMPANY
2719 Elm Street Telephone CA 9228 Los Angeles, Calif.



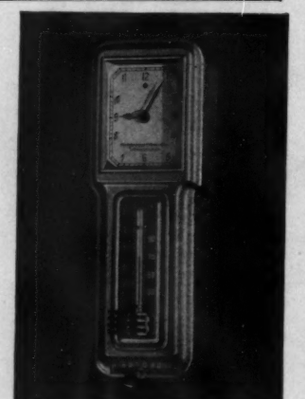
"Kettleman" Type Orifice Fitting
Recommended for Gas-Lift and Repressuring Conditions.

SATISFIED CUSTOMERS

■ Keep your customers satisfied by recommending and installing the Chronotherm*... the greatest achievement in the field of automatic heating. It provides unvarying temperatures and will entirely eliminate "Cold 70°", and save fuel by doing so. Minneapolis-Honeywell Regulator Co., 401 East 28th Street, Minneapolis, Minn.

■

MINNEAPOLIS-HONEYWELL
Control Systems



The Chronotherm*... Provides absolute unvarying temperatures and eliminates "Cold 70°".
** Formerly called Thermochron.*

Minneapolis Gas Light Co. Heating Sales Campaign

Stimulated by a reduction in rates occasioned by the arrival of natural gas in Minneapolis, a gas heating sales department has been organized by the Minneapolis Gas Light Co. under the direction of E. J. Boyer, new business manager and J. E. Swenson, industrial engineer. To drive toward a goal of 1,000 heating job sales, 25 trained heating salesmen have been added to the sales force. The campaign is backed by newspaper, billboard, bulletin-board and mailing piece advertising. A dealer cooperative plan is in effect. All burners are sold as package units including complete automatic controls. A 36-month payment plan has been adopted.

Utility Rents Unit to Modernize Demoded Water Heaters

The St. Louis County Gas Co., Webster Groves, Mo., is making it possible, through its latest rental-sales activity, for every customer of the company owning an ordinary hot water tank to enjoy automatic hot water service by the addition of a conversion heater unit to his old tank. The unit may be rented by the month from the company for a small amount, and after a fixed number of rental payments have been made the heater unit becomes the property of the renter. Should the renter at any time during the rental period wish to exchange the converted heater and unit for an automatic storage water heater he is credited with approximately half the amount of rental paid on the conversion unit.

Relief Valves Submitted To Laboratories For Testing

In May and June over 25 pressure, temperature, or vacuum relief valves for use on water heaters were submitted for testing at the A.G.A. testing laboratories. When these units are brought to the point of compliance they will be the first such accessories to be listed in the Association's Directory of Approved Gas Appliances and Listed Accessories in accordance with the American Standard Listing Requirements for Relief and Automatic Gas Shut-Off Valves for Use on Water Heating Systems. Regulators, conversion burners, and burner valves are the only varieties of accessories now listed in that Directory.

Chicago Dust Deposit Decreased 25 Per Cent, Survey Reveals

A city-wide smoke survey recently completed for the city of Chicago estimated the monthly average dust deposit for 1934 at 95 tons per square mile, compared with 390 tons in 1930. The surveyors credit better firing methods with the improved conditions, but records of the Peoples Gas Light and Coke Co. indicate that an additional 30,000 homes in metropolitan Chicago have changed to gas heating methods since 1930.

Portland Gas & Coke Promotions

Percy Black, T. H. Bailey and C. W. Steele, in the sales department of the Portland Gas & Coke Co., have been promoted to field sales supervisors. Ted McDonald and L. E. Swan were made territorial representatives.

Kansas Pipe Line & Gas Files Withdrawal Application

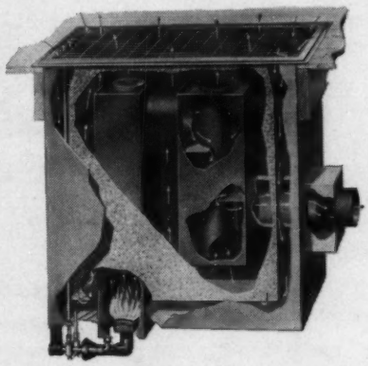
THE Kansas Pipe Line & Gas Co., Salina, Kan., has filed application with the State Corporation Commission to withdraw as natural gas distributor in 17 Kansas communities due to expiration of pipe line leases with the Stanolind Pipe Line Co. from which the utility received its gas supply.

Permission was asked to transfer the company's franchises at Westmoreland, Wheaton, Linn, Greenleaf, Barnes, Haddam, and Morrowville to the Kansas Power and Light Co. The Kansas Pipe Line & Gas Co. also asked permission to transfer its franchises at Lecompton, Oskaloosa. Perry and Valley Falls to the Union Public Service Co. Distribution systems at Hoyt, Delia, Emmett, Mahaska, Narka and Blaine would be abandoned.

The Kansas Pipe Line & Gas Co. leases with the Stanolind Pipe Line Co. expire May 30, 1936, and the latter has announced that the leases will not be renewed. Since it is withdrawing from business activities in Kansas, the company has asked that its license as pipe line and common carrier company be cancelled by the State Corporation Commission.

"Warco" Floor Furnace Line Introduced by Ward Heater

Ward Heater Co., of Los Angeles, announces its new "Warco" line of floor furnaces, available in two sizes: Model 200—25,000 B.t.u.'s, and Model 300—35,000 B.t.u.'s.



The new appliance is made of copper-bearing, rust-resisting 20-gauge iron, hand acetylene welded, equipped with cast iron slotted burner and is capped with a fabricated steel register of lustrous finish.

"Warco" models carry a 5-year guarantee. The model 300 is of narrow design to fit between floor joists.

Minn. Northern Power Now Known as Montana-Dakota Utilities Co.

EFFECTIVE July 1, 1935, the Minnesota Northern Power Co. changed its name to "Montana-Dakota Utilities Co." and acquired all of the assets and assumed the liabilities of Montana-Dakota Utilities Co., Gas Development Company, Northwest States Utilities Co., and Bowdoin Utilities Co. The Minnesota Northern Power Co. has also liquidated several small wholly owned subsidiaries.

As the result of all of these transactions Montana-Dakota Utilities Co. (formerly Minnesota Northern Power Co.) now owns and operates all of the operating properties of the above mentioned companies, and in addition also owns all of the common and substantially all of the preferred stock of Montana-Dakota Power Company. The company also owns a majority of the common and preferred stocks of Montana Cities Gas Co.

The Montana-Dakota Utilities Co. (formerly Minnesota Northern Power Co.) was organized under the Laws of Delaware in 1924 and shortly thereafter began acquiring the stocks and properties of various electric and gas utility companies operating in North and South Dakota, Montana, and Wyoming. The consoldiated company now owns or controls through its subsidiaries Montana-Dakota Power Company and Montana Cities Gas Company, large gas reserves in Montana and Wyoming, 1,050 miles of natural gas transmission lines, 935 miles of electric transmission lines and serves natural gas or electricity to 135 cities and towns in the above mentioned states.

With the view to simplifying its corporate structure, the company has for some weeks been working on plans to consolidate subsidiaries and reduce the organization to as nearly one operating company as possible.

Texas Production Allowables Fixed by Railroad Commission

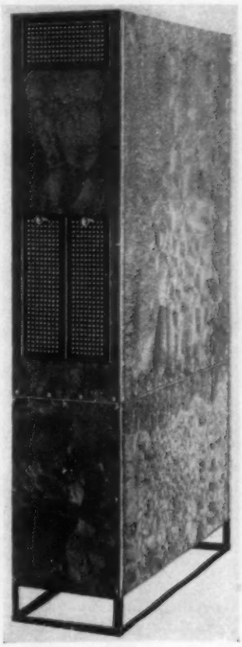
FIRST orders have been issued by the Texas Railroad Commission fixing allowable production of sweet natural gas in Texas, effective 7 a.m. August 1. The Panhandle area is divided into two districts, east and west, for purposes of fixing allowables. The fixed daily allowable for the West Panhandle field is 482,143,000 cu. ft. computed at a pressure base of 4 ounces per sq. in. above 14.4 pounds per sq. in., a standard base and flowing temperature of 60° F., corrected for pressure according to Boyle's law. East Panhandle field daily allowable is 88.407,000 cu. ft. Each well in the Panhandle fields is restricted in daily production to proration schedules adopted by the Commission and made part of its findings. Daily allowables in the east zone are on a basis of 50 per cent potential and 50 per cent acreage with no wells allocated to more than 160 acres. The west zone is also governed by the 50-50 potential acreage with no well allocated to more than 640 acres.

In sections outside of the Panhandle orders are of a general nature since the Commission's data on the sweet natural gas fields are not complete. The order finds that total daily demand for sweet gas outside the Panhandle is 250,842,000 cu. ft. Daily allowable production per well will be in accordance to the relation of potential gas production of each well to the total demand for the field in which the well is located.

Service Extensions by Lone Star

Community Natural Gas Co., Dallas, Texas, early in August expects to complete construction of approximately 9,000 ft. of 4-inch intermediate pressure mains, 5,500 ft. of 3- and 4-inch low pressure mains and low pressure regulator facilities in Bryan, Texas, to improve and extend the service to the section of the city near College Station. Fifty new customers will be added to the line.

New Climator Unit Announced by L. J. Mueller Furnace Co.



The L. J. Mueller Furnace Co. of Milwaukee, Wis., announces a new gas-fired air heating and conditioning unit to be designated as the Climator Cabinet Type Unit Heater. This appliance is designed for use in shops, stores, showrooms and other commercial and industrial applications and is adaptable for residences without basements.

The cabinet unit heats, humidifies and filters the air and distributes it by forced circulation from a fan installed below the heating unit. Heat transfer units are regular Mueller Gas-Era pressed steel sections. Humidity is supplied automatically and return air is drawn through filters at floor level. The new product is carried in four sizes with output ratings of 67,500 to 168,750 B.t.u.'s per hour, and air deliveries of 900 to 2,250 C.F.M. respectively.

Descriptive literature on the Climator unit heater will be mailed upon application to the manufacturer.

Major Forward Returns from West Coast Trip

Major Alexander Forward, managing director of the American Gas Association, left his New York headquarters in June for an extended swing around the circuit, attending the Michigan Gas Association Convention and continuing to the West coast, where he visited gas officials in Portland, Seattle, San Francisco, Los Angeles and San Diego. Following several days on the west coast during which he visited the California Pacific International Exposition at San Diego, Major Forward returned East in July by way of the Panama Canal. He was accompanied by his daughter, Miss Virginia Forward.

Budget Payment Plan For Gas Heating Bills

Peoples Gas and Electric Co., Mason City, Iowa, has inaugurated a special budget plan for the payment of gas heating bills. The plan enables the customer to pay his bills in equal amounts over a 12-months' period, eliminating the necessity of paying the larger heating bills during the peak heating season. The plan, however, makes no guarantee of the amount of the bill.

Annual Corrosion Conference at Los Angeles

SUBJECTS which held the spotlight at the fourth annual Southern California Corrosion Conference which met at Los Angeles on July 23 included use of copper in modern gas distribution systems, cathodic protection, Cellophane and Kodopak, as protective wrappings, and various other phases of pipe protection. This year the meeting was conducted under the auspices of the Pacific Coast Gas Association's Pipe Protection Committee, of which Arthur B. Allyne, chemist for Southern Counties Gas Co., is chairman.

Mr. Allyne called the meeting to order at 2:00 p.m., the session being held in L. A. Gas and Electric Corp. auditorium. About 150 men representing gas, oil, water, street railway and telephone companies, together with representatives of pipe and protective materials firms, were present.

W. M. Henderson, superintendent of distribution for Los Angeles Gas & Electric Corp., was first introduced by Mr. Allyne, and in turn introduced Dr. Scott Ewing to the audience. Dr. Ewing, A.G.A. Research Associate in the United States Bureau of Standards, has pipe samples buried in a number of locations throughout the country for test of various types of protective coatings, two of the burial grounds being in the vicinity of Los Angeles. Periodic examination of the samples is being made, and data gathered from these burials and from experiences of gas companies, are expected to form the basis of effective laboratory tests for evaluating pipe coating materials. Scope of the current research was covered in Dr. Ewing's informal remarks.

F. D. Posey, of the General Petroleum Corp. of Calif., read a paper describing the materials used and terrain traversed in laying the company's new 10-inch 80-mile pipe line from Lebec to Torrance, Calif. The greater portion of the line, on the basis of corrosion experience with an older line over the same route, was found to require practically no protection. A survey was made on the balance of the route, classifying the soils by the nipple and can method and taking data on topography conditions, streets, nature of paving, density of population, etc.

On the basis of these findings a considerable portion was laid bare and the remainder protected in one of three ways according to the degree of corrosiveness of the soil. Treatment consisted of various degrees of wrapping and bitumen, the wrapping being done in the company's yard in Los Angeles. Field joints were given the same protective treatment.

Wherever the line traversed potential danger points, as culverts, sewers or other underground structures, or passed under railroad crossings, it was boxed in redwood and filled around with asphalt. Insulation joints on either side of the crossing were installed where the line passed under an electric railway.

Slides of construction scenes were shown by Mr. Posey, after which a volley of questions and lively discussion concluded this feature of the program.

A paper on recent developments in the use of copper pipe in gas distribution systems was presented by F. A. Hough, distribution engineer of Southern Counties Gas Co. of Calif., to be found in full beginning on page 9 of this issue. A discussion of the experiences of other companies with copper pipe followed Mr. Hough's paper. Guy Corfield, research engineer of the Los Angeles Gas and Electric Corp., contributed a summary of a paper by E. A. Munyan, given before the Memphis meeting of the A.G.A. Natural Gas Department, describing use of copper pipe by the Union Gas and Electric Co.

Lee Holtz, general superintendent of manufacture and distribution for Southern California Gas Co., described his company's experience over the past three years with Cellophane and Kodopak as pipe wrapping materials. Present indications are that the experiments will prove highly satisfactory; for example, thus far tree roots have not been able to pierce this type of wrapping. Mr. Holtz will give details on the use of these materials in an early issue of *Western Gas.*

A symposium on cathodic protection occupied the rest of the afternoon. Discussion was led by Mr. Corfield, who introduced the subject with a brief definition and reviewed its history. He commented upon a paper given before the Memphis Natural Gas Department convention by Geo. I. Rhodes, vice-president of Ford-Bacon and Davis, Inc., in which a treatment was described consisting essentially of using a large number of small electrodes evenly spaced along a pipe line and located quite close to it. Contained in the paper also was the suggested use of zinc as an alternative source of electric energy. Mr. Corfield also brought out that Ford-Bacon and Davis make certain patent claims in the field of cathodic protection, and considerable discussion followed from the floor as to how broad these claims might be and as to their status with respect to existing and future cathodic protection installations.

Discussion then centered on the use of zinc and some difference of opinion as to its effectiveness was evident. Dr. Ewing gave a description of a zinc installation being made by Ford-Bacon and Davis in Louisiana.

The symposium was concluded with a discussion of means other than zinc for obtaining electrical energy where power lines are not readily available, among them use of windmills. The effectiveness of intermittent applications of protective current was discussed.

"Heat Hour" Unit Used in "Heat Wave" Campaign

THE "Heat Wave" is the designation of a load-building campaign being conducted from July 1 to November 1 by the Gas Distribution Department of the Los Angeles Gas & Electric Corp. The company's seven distribution districts are arrayed against each other for contest purposes.

Inequalities due to the different number of men in each district are to be ironed out by evaluating gas appliance sales in terms of average annual gas consumption rather than on merchandise value. The average annual gas consumption in cu. ft. will be broken down further into *heat hours* of gas load. The heat equivalent of a *heat hour** is 3,415 B.t.u.'s. Average annual gas consumption for the various appliances, as computed by the Gas Distribution Department of the Los Angeles Gas & Electric Corp. for the purposes of the campaign, is as follows:

	Annual Avg. Gas Consumption Cu. Ft.	Heat Hours
Instantaneous water heater	43,600	14,044
Thermo storage water heater	38,600	12,433
Double warm air furnace	30,000	9,663
Single warm air furnace	15,000	4,831
Gas range	12,000	3,865
Refrigerator	10,000	3,221
Floor furnace	10,000	3,221
Portable space heaters	5,000	1,610

On appliances not listed above, a central "weather bureau" decides on the number of heat hours to be allowed for campaign credit.

The function of the distribution department in this drive is to secure prospects which are turned over to the new business department where they are developed to the closing point; then the sales are routed through dealer channels according to the prospects' preferences.

Contest results in the several districts are tabulated on a chart representing a thermometer which will rise one degree per each 10,000 *heat hours* of load equivalent sold, the hottest district to be declared the winner with each member of the winning group receiving a separate award. A penalty of 100 *heat hours,* termed an "icicle", is imposed for each prospect that does not result in a sale.

*For a discussion of the heat hour see "The *Heat Hour*: Proposed Energy Unit", by Donald Henry of Stone & Webster Engineering Corp., in the March, 1935, issue of *Western Gas.*

Portland Gas & Coke Co. Reorganizes Office Personnel

In line with the recent reorganization of its customers office and accounting department, the Portland Gas & Coke Co. announces the following appointments:

George Mackenzie, chief of the department.

C. R. Johnson, in charge of first floor customers' office.

J. A. H. Dodd, credit and collection bureau supervisor.

F. J. Reverman, bookkeeping bureau supervisor.

E. R. Merrill, accounting department supervisor.

N. H. Stephens, general bookkeeping bureau supervisor.

L. M. Smith, stores accounting bureau supervisor.

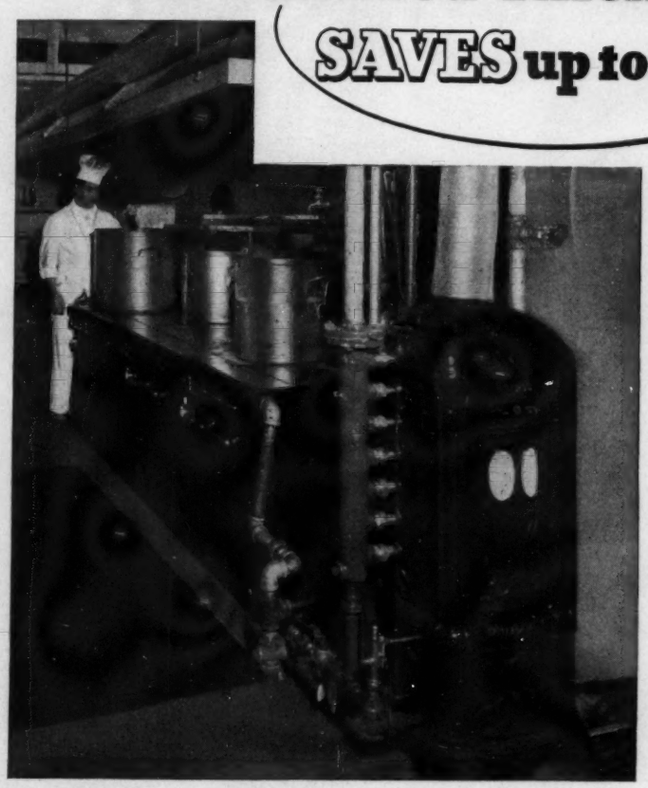
Cecil Griffith, statistical bureau supervisor.

H. S. Gaylord, paymaster.

Paso Robles Office Building

According to R. E. Easton, president of the Santa Maria Gas Co., Santa Maria, Calif., a 25- by 70-ft. lot has been purchased in Paso Robles by his company for the erection of a modern one-story headquarters.

Modernized Kitchen SAVES up to 50%



SAMPSELL'S Los Angeles has three sections of new gas ranges, with insulated, automatically-controlled ovens . . . 2 deep fat fryers, also regulated by thermostat . . . and a gas automatic water heater (right foreground) replacing obsolete coils.

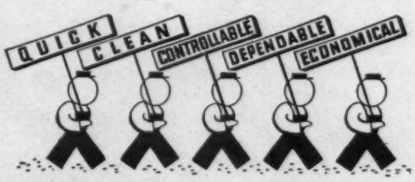
Behind the scenes, in many restaurants, a transformation is taking place . . . . . and showing tangible results in the business office.

New gas-fired equipment, replacing obsolete appliances, is paying for itself by reducing fuel bills and waste.

SAMPSELL'S, popular downtown Los Angeles restaurant, recently installed all new gas equipment. A 40% to 50% reduction in fuel bills is reported by Manager F. R. Byrun.

In addition, the new insulated ovens, thermostatically controlled, have diminished meat shrinkage by fully two-thirds, he reports; while the new controlled deep fat fryers save approximately 30 pounds of grease daily.

It is "good business" to modernize with new gas appliances. The record proves it. Phone your gas company for the services of a technically-trained representative who knows restaurant needs. Get latest facts and figures without cost or obligation.



Gas
The modern fuel

PACIFIC COAST GAS ASSOCIATION, INC.
(A non-profit service organization of which your Gas Company is a member)
447 SUTTER STREET, SAN FRANCISCO, CALIFORNIA

IN STEP

With Progress

Closely coordinated with sales activities, the P.C.G.A. Cooperative Advertising this year emphasizes **modernization** in the commercial cooking field. Typifying the series is the advertisement at left, published in leading restaurant and hotel trade journals.

✦

Among other prominent Pacific Coast restaurants featured in these advertisements during recent months are:

Caesar's	San Diego
White Log Taverns	Seattle to Hollywood
Foster's Lunch System	San Francisco Bay District
Mrs. Gray's Inn	Beverly Hills
Castellammare Inn	Santa Monica
Clark & Monson Chain	Seattle
Hotel Mayflower	Seattle
Roudell Coffee Shop	Santa Cruz

✦

All of these satisfied users of gas fuel and modern gas appliances gave endorsements calculated to exert a powerful influence upon other restaurant managers and owners up and down the Coast.

Publicity and Advertising Section
J. S. Spaulding (L. A. G. & E.)
Chairman

Cooperative Advertising Committee
A. C. Joy (P. G. & E.) Chairman

Porcelain Enamel Institute Prepares Sales Manual

THE first edition of a new brochure entitled "Sales Manual for Porcelain Enamel" has been prepared by the Educational Bureau of the Porcelain Enamel Institute. Copies may be secured from Institute headquarters at 612 North Michigan Ave., Chicago, Ill.

Contents of the book tell in non-technical language the origin, nature, application, uses

and advantages of porcelain enamel. From the historic beginnings of porcelain enameling as an ancient art, the book proceeds to the modern story of porcelain enamel on steel and iron.

For the benefit of those engaged in sale of enameled products, a good deal of material is introduced on how porcelain enamel may be used as a selling feature—on refrigerators, clothes washers, stoves, ranges, room heaters, utensils and other home appliances and equipment. Unique uses for the product, ranging from telephone dials to steel sheets for building exteriors, are described, and even more varied fields for future uses are suggested such as full color reproduction for everlasting mural decorations.

Throughout the brochure are shown 92 separate illustrations, numerous of them dealing with home appliances.

North Shore Gas Co. Celebrates 50th Anniversary

THE North Shore Gas Co. with headquarters in Waukegan, Ill., is celebrating its 50th Anniversary. Advertising and publicity released by the company in honor of the occasion point out for the interest of its customers, the early history of the organization.

In 1885 the company was started as the Waukegan Gas Light Co. Later it became the North Shore Consolidated Gas Co. and subsequently the North Shore Gas Co.

The North Shore Gas Co. is said to be the first in the Middlewest to use high pressure distribution. This came about in 1900 when the facilities of the company were extended to Highland Park, making the high pressure system necessary.

The company began holding cooking schools in the Spring of 1902 and has maintained the feature ever since.

Starting with Waukegan, the company now supplies service to North Chicago, Lake Forest, Lake Bluff, Highland Park, Highwood, Deerfield, Winnetka, Glencoe, Libertyville, Fort Sheridan, Ravinia, Indian Hill, Hubbard Woods, Winthrop Harbor, Grays Lake, Everett, Great Lakes, Gurnee, Mundelein, Diamond Lake, Half Day, Prairie View, Optakisic and Zion.

The company operates as a subsidiary of the North Continent Utilities Corp. of Chicago, with W. A. Baehr as president, R. B. Meredith, vice-president W. B. Baehr, vice-president and secretary, A. C. Winters, vice-president and treasurer, and J. G. Hart as manager at Waukegan.

New Pipe Line to Connect Montcalm Development

THE Consumers Power Co. of Jackson, Mich., has begun construction on a 14-mile 6-inch pipe line connecting up new wells in the Montcalm area with the company's high pressure line serving Midland, Saginaw and Bay City from the Broomfield area 14 miles west of Mt. Pleasant, Mich. The new Montcalm area now has 10 producing wells, the largest with an initial open flow capacity of 9,126,000 cu. ft., the smallest 1,000,000 cu. ft., three 7,000,000 cu. ft. and one about 8,500,000 cu. ft. Present plans call for the drilling of 25 to 30 more wells during the next four months.

The new line, scheduled to be completed in August, will tap the present 8-inch high pressure line between the Broomfield metering station and Mt. Pleasant about 10 miles west of Mt. Plaesant. Running in a general southwesterly direction, it will pass through the village of Blanchard, where franchise negotiations are now in progress.

Petroleum Transportation Co., made up of six Michigan producers, is the gathering organization for the Montcalm area, with some 15,000 acres under contract, and has contracted to supply Consumers Power Co. In addition to the 14 miles of 6-inch steel pipe to be laid by Consumers Power Co., some 7 miles of 4- and 6-inch field lines will be necessary.

Rental-Purchase Plan on Water Heaters

(Continued from Page 17)

plumbers began immediately to rent water heaters. Others stood by, waiting to see what happened.

Gradually, the program gained momentum. We set 200 heaters as our quota by January 1, 1934. A big banquet was to be the reward. Before Christmas we had passed the 200 mark. The party was held and in their enthusiasm at making their quota, a new one was set up. They decided then and there to make it 1,000 heaters in a year's time; that was by October 17, 1934.

It seemed like a long shot then—but we didn't know what the cooperating plumbers could really do. We got them together at pep meetings with the salesmen. Prizes were offered contingent on making the quota. Those plumbers, who had sat back waiting for results, gradually got the spirit and things began to click.

Well, to make a long story short, when October 17th rolled around, we had our 1,000 heaters and some to spare. The result was something we hadn't dreamed of when starting the rental purchase plan.

Our plan is still in effect. To date, we have just put on our lines approximately 1,600 heaters, which just doubles the number we had prior to our rental plan. We hope to have at least 2,000 by January 1, 1936.

In spite of our liberal terms, we have had very few reverts. Less than 5 per cent of the heaters rented have been returned.

Monthly rental payments have been exceptionally good. Less than 2 per cent of our accounts are delinquent. The small monthly rental is easily paid on the regular monthly bill.

Much has been said, good and bad, about dealer cooperation. We in Rockford feel that it does pay. By putting 1,600 automatic gas heaters on our lines, increased load has resulted for the gas company. In receiving thousands of dollars in installations and bonuses, the local master plumbers have been helped through a trying business period.

This plan has caused a spirit of friendly cooperation to spring up between these dealers and the local utility, which should be of mutual benefit in years to come.

ROBERTSHAW
THERMOSTATS
Over two million in daily use on gas ranges. Hundreds of thousands in daily use on water heaters, space heaters and every type of gas appliance.
Dependability Counts!
ROBERTSHAW THERMOSTAT COMPANY • YOUNGWOOD, PA.

No. 1 of a Series
Reprinted from "In Gear"—the Pacific Gas and Electric Company's plan for united industry cooperation during 1935.

P·G·and E·

APPLIANCE SALES POLICIES

Adopted in 1925 . . . First Published in 1927

We believe that the public must be served.

That best public service can only come from a united industry, composed of the utility, appliance manufacturers, jobbers and dealer trade.

That an organized effort by the entire industry is essential if the maximum amount of business is to accrue to each group through creation of consumer acceptance of our products.

That such a united industry can and will successfully compete with other organized industries to the end that a fair share of the public buying power will be obtained.

That it is the duty of the utility particularly to do pioneering selling in that appliance field where there is no public demand or due to special conditions no adequate retail profit for creative and aggressive selling by retailers.

That the utility, in addition to supplying quality service at fair rates, assume leadership in the sale of quality appliances at established retail prices, adhering to ethical, constructive merchandising methods on a basis that will encourage the activity of all legitimate retailers.

That such ethical leadership has stimulated and will continue to stimulate public buying of appliances, installation work, and general supplies.

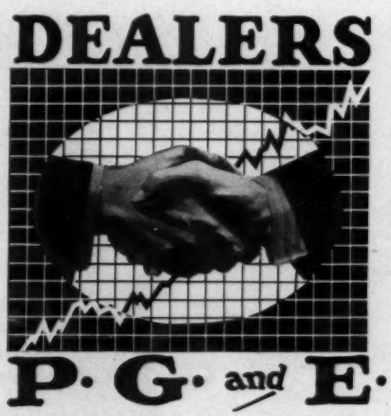
That it is the desire of the Pacific Gas and Electric Company to continue encouraging as many legitimate retail appliance dealers as can economically operate; to cooperate with such natural outlets by financing and executing constructive educational selling and advertising campaigns.

That merchants and dealers can and should retail appliances at prices fair to themselves and the public by such methods as have been found to be sound by successful retailers.

That the manufacturers and jobbers can best contribute to this plan by supplying well advertised merchandise of unquestionable quality at prices which permit the seller a legitimate profit margin.

The Pacific Gas and Electric Company will continue:

To keep an open mind. To be guided by facts. To hold out to all groups the right to full discussion. To hold to those policies we believe to be right but to quickly concede where we find we are wrong.



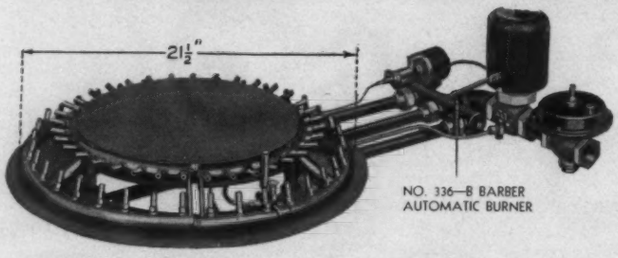
PACIFIC GAS AND ELECTRIC COMPANY

Owned, Operated, Managed by Californians

WG-208-835

The Trend of the Times

is to BARBER BURNERS!



Are you fed up with makeshift, improperly designed, meter-racing, "trick" gas conversion burners? Then it's time for you to join the growing procession of converts to Barber—the leading conversion burner on the market today.

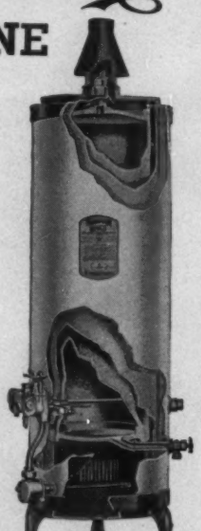
Tailor-made to suit and fit the grate dimensions of round or oblong furnaces or boilers. Insure proper scrubbing flame action on side walls of firebox, the hottest fire per foot of gas. Equipped with Klixon or Baltimore Safety Pilot for positive and accurate control. Listed in the A. G. A. Directory of Approved Appliances. Write today for New Illustrated Descriptive Bulletin and Revised Prices.

THE BARBER GAS BURNER CO.
3704 Superior Ave. Cleveland, Ohio

BARBER *Automatic* **JET GAS BURNERS**
for Warm Air Furnaces,
Steam and Hot Water Boilers

Welsbach
HOTZONE

Self-action storage gas water heaters



Approved by A. G. A. Laboratory

Heaters are made in all domestic sizes with 300 lb. test galvanized or Everdur tank.

Write for Details

WELSBACH COMPANY
Gloucester City, N. J.
SAN FRANCISCO, CALIF. CHICAGO, ILL.

"I wouldn't take a MILLION DOLLARS for my WARD . . ."

That's what Mrs. J. C. Toler of 8920 Dorrington Ave., Hollywood, writes us. Just one of thousands of satisfied users . . . satisfied because they can depend on their WARD floor furnaces for comfort and economy in operation. If your customer has a heating problem, remember . . . "your load is as good as the appliance you sell."

Ask us for further information

WARD HEATER COMPANY
1800 W. WASHINGTON BLVD.
Telephone PArkway 9171
Los Angeles

Uncle Sam—Fuel Buyer

(Continued from Page 14)

be used for new buildings and new equipment at all of the Indian Reservations. Many of these reservations are in the natural gas territory which makes it important that gas company officials and manufacturers make frequent contact with the superintendents of the various reservations, for as soon as funds have been designated these officials will be notified what amount is set aside for their particular reservation and for what purpose the funds will be expended.

New Housing Loan Set-Up

An important change to the gas industry has just been made by the Federal Housing Administration in the form of an amendment to Title I of the National Housing Act. It is now possible for owners of buildings or those with long leases to negotiate loans up to $50,000 for the reconditioning of buildings and the installation of new equipment. This is of special importance to appliance manufacturers, as under the Amendment, hotels and restaurant owners or lessees of same can negotiate through the Federal Housing Administration for loans for the installation of new equipment. Both gas companies and manufacturers can now make an intensive canvass for this type of business. The gas industry has fared very well with the Federal Housing Administration and the future is even brighter. Early in the formation of this government department, the American Gas Association was requested to name two men as Industry Advisors to serve without pay and to represent the two branches of the Association. John W. West, Jr., of the A.G.A. staff was appointed on the board to represent the gas utilities and the writer was appointed to represent the manufacturers. The closest possible cooperation has existed and the Housing Administration is very grateful for the wholehearted support given by our industry. Much credit is due C. W. Berghorn, secretary of the Manufacturers' Section of the American Gas Association, for his many helpful suggestions and cooperation with the manufacturers.

The Civilian Conservation Corps camps is an important agency to be watched by the manufacturers of equipment and ranges other than gas. It is not believed that gas will be available at many of these outlying camps but manufacturers of coal and wood stoves and other equipment should benefit by this program. Where camps are not located in proximity to free or a very cheap supply of coal or wood, and where the condition of roads will permit of easy access to the camps, the Government would consider the use of bottled gases. There are now 640 camps in full operation on a basis of about 200 men to a camp. Provision is made for 1,276 new camps to bring the total to 2,916 camps with an increment of 600,000 men. These camps are all under the United States Army. Interested manufacturers should contact the Corps Area Commanders of the nine different Corps Areas in the United States.

The Subsistence Homesteads Division has been transferred to the newly created Reset-

tlement Administration under Dr. Rexford G. Tugwell, Assistant Secretary of Agriculture. The immediate head of the organization is Charles E. Pynchon, general manager, Administration Building, Department of Agriculture, Washington, D. C. There are more than 75 of these projects provided for under the 4 billion dollar Public Works program. They will be located in practically all of the states and in some states there will be several of them. Many of these sites are in proximity to gas lines and all are potential customers for appliances. Manufacturers may address Mr. Pynchon, who will furnish detailed information, as well as the names and addresses of the various state directors.

The Low Rent Housing Division of P.W.A. is, from the standpoint of potential business to the gas industry, one of the most important of the government activities. No specific sum has been set aside for this activity, but every city in the United States with a population of 75,000 or over is a prospective site for one or more of these slum clearance projects. I am told that San Francisco is the only city so far that has notified the government it was not interested in a project for that city. A tremendous amount of work has been done by officials of the American Gas Association in having gas receive its proper consideration in this particular government activity. Many gas company officials have visited Washington during the past year for personal interviews with the government officials handling this work and probably there is less known regarding its many ramifications than of any other government bureau. All of this business is handled from Washington under the direction of A. R. Clas, Director of the Housing Division, Public Works Administration, Washington, D. C., but it is suggested that all communications pertaining to this particular government set-up be handled through our office. It is regretted that limited space will not permit of a detailed explanation as to how this business is handled, but the writer will be glad to answer any correspondence on the subject as to size of project, estimated annual consumption and number of appliances to be installed. It might be added, however, that when it has been decided to locate a slum clearance project in a city an engineer is sent from Washington to that city to confer with utility officials with respect to rates, etc. It is suggested that utility officials issue such instructions to their personnel that when this engineer visits their office, he be sent to the proper officials for a discussion of these matters. This suggestion is made for the reason that in some instances in the past these government engineers have only met some rate clerk at the desk and this has been very much to the disadvantage of the gas industry.

Through the efforts of the American Gas Association in promoting the sale of gas, the various Government departments are now contracting for more than 20 billion cubic feet annually. This has naturally created an enormous market for gas-burning appliances. We keep in close touch with every government department, assisting them in every possible way in obtaining information as to the availability of gas, its B.t.u. content, rate information, etc. In many instances we represent the utility through the entire negotiations with the Government. Members of the industry may feel free to address the writer's office for information concerning any of their Government matters.

The No. 73-10
N.G.E Burner
for installation in
ROUND FURNACES
(Warm Air, Hot Water, Steam)

N.G.E.

in introducing this improved *gas burner offers* Highest Efficiency at a Moderate Price

In the commercial heating field, great numbers of small round furnaces offer a very desirable potential load. Because in such installations fuel consumption is relatively low, conversion burner equipment must be not only moderately priced, but highly efficient.

Both of these advantages are realized in the improved No. 73-10 N.G.E. Burner. Their application is well suited to boilers not exceeding 18″ in diameter, with a capacity up to 250 cu. ft. of gas per hr. at 6″ gas pressure.

For the majority of applications, the use of eight fan shaped refractories is recommended to keep the products of combustion in intimate contact with the heating surface. These refractories are supplied with the burner.

The installation of the No. 73-10 is very simple, lending itself to either manual or automatic control. The burner is cast-iron construction throughout and is built for a lifetime of usage.

In capacity, the No. 73-10 is extremely flexible, ranging from 70 to 250 cu. ft. per hour at 6″ gas pressure. It is equipped with an adjustable mixer and adjustable orifice for satisfactory proportioning of air and gas.

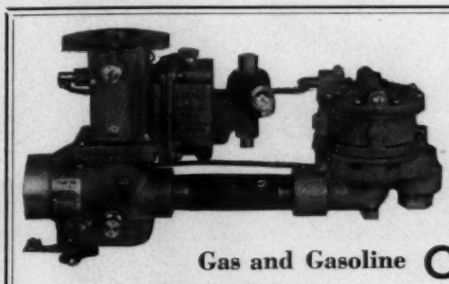
The N.G.E. No. 73-10 also is adaptable to small industrial usages, such as vertical boilers, kettles, etc.

NATURAL GAS·EQUIPMENT INC.

Petroleum Securities Bldg. Los Angeles, Calif. | 1123 Harrison St. San Francisco, Calif. | Arizona distributors Crane Co.

Distributed East of Rockies by Surface Combustion Corporation—Toledo, Ohio.

LOOK TO THE PIONEERS FOR CONTINUED LEADERSHIP



When Gas Is Available
Cut Fuel Costs
By Using Gas in
Your Gasoline Engine

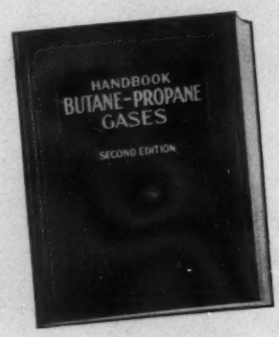
With the ENSIGN
Gas and Gasoline COMBINATION CARBURETOR

You can change instantly from one fuel to the other

This device combines the advantages of the Ensign Gas and Gasoline carburetors into a single unit and assures the most efficient and economical operation from either fuel—with no time lost in changing from one fuel to the other. Adaptable to practically all types of stationary engines. Write for detailed information.

ENSIGN CARBURETOR COMPANY, Ltd.
7010 S. Alameda St., P.O. Box 606, Huntington Park, Calif.

THE ONLY HANDBOOK OF **BUTANE–PROPANE GASES**



Big Second Edition Now Available

CONTENTS: Summary of Two Years' Developments: Use in Internal Combustion Engines: Design and Installation of Storage: Supply from Petroleum Refineries: Engineering Data on the Lower Olefins: Domestic Appliance Testing and Utilization: Economic Comparisons with Coal, Oil, Electricity, Producer Gas, Manufactured Gas: Town Plants: Manufacture from Natural Gas: Special Uses: Volume Correction Factors: Supplements and Revisions: Transportation: Use with Other Gases: Analysis and Testing: Properties of Mixtures: Bottled Gas Distribution: Bibliography: Central Plant Directory: Catalogue Section:

$5.00—Send Check or Money Order To

WESTERN GAS, *Publishers*
810 South Spring St.
Los Angeles, California

PAYNE

Console Heaters

Payne Console Heaters are correctly priced, beautifully finished in colors to harmonize with room surroundings, and afford maximum heating efficiency. Four sizes available for apartments, offices, schools, homes. Vented installation is recommended, but they are A.G.A. approved either with or without.

For anything in GAS heating write

PAYNE FURNACE & SUPPLY CO.
BEVERLY HILLS, CALIFORNIA

REFRACTORIES

GENERAL CERAMICS COMPANY
• REFRACTORIES •

For Conversion Burners, Circulating Heaters, etc.

Because they are uniformly accurate, strong, and dependable in every way, General Ceramics Refractories are used by most of the leading manufacturers of gas heating appliances. • Our engineers will gladly cooperate with you.

General Ceramics Company, 30 Rockefeller Plaza, New York

Ice Block Main Stopper

(Continued from Page 15)

alent of one pint of water in the form of shaved ice and 3½ pounds of dry-ice. Larger size mains require proportionately greater amounts of materials.

Two ice blocks a few feet apart make it possible to install or replace any fittings in the line between the blocks with perfect safety and with no interruptions in service to customers. If the supply is from one direction only, a by-pass is installed around the ice blocks. Similar applications now make interruptionless meter changes and piping revisions in industrial customers' and large apartment customers' cases possible.

The whole process furnishes a quick, safe and inexpensive method of eliminating the interruption problem and opens up new fields of flexibility in the operation of any distrbution system.

Heating Essentials

(Continued from Page 16)

Assuming that we have now selected the proper type of furnace, and regardless of whether it is of central or unit design, the following remarks on installation will apply. Good furnaces and their manufacturers' reputations can be ruined if the piping and registers are undersize, poorly constructed or improperly insulated. Furthermore, register locations, particularly on gravity type installations, should be given serious consideration with respect to strategic points for the warm air delivery so as to keep the runs as short as possible and not sacrifice valuable wall space for anticipated or existing furniture arrangements.

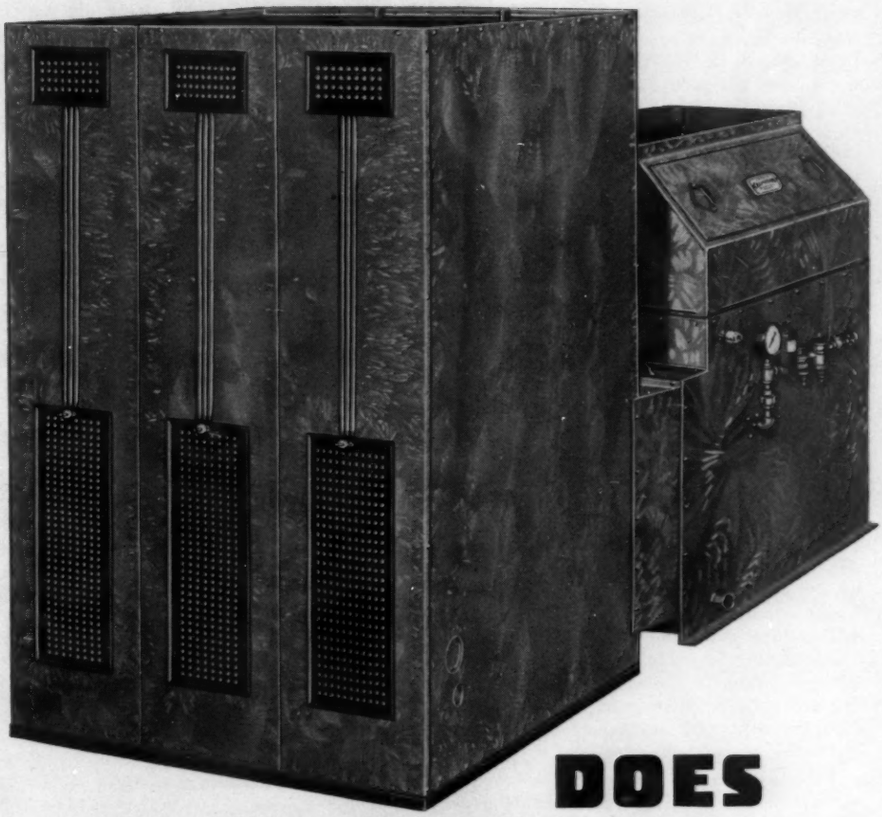
The method of computing proper sizes of registers and piping is covered in the various warm air heating manuals and in some cases by city ordinances, and should be closely followed to obtain the best results. The matter of pipe insulation depends entirely upon climatic conditions. In districts where zero or colder weather is experienced and where these warm air runs are not exposed to outside temperatures, they are frequently allowed to remain uncovered or at most with a thin covering of asbestos paper, so that the basement may be kept warm to prevent the freezing of the plumbing lines. However, in milder climates where these runs are exposed to outside temperatures, it is absolutely necessary to insulate properly against transmission heat loss by covering the warm air piping with aircell asbestos paper or some other equally efficient insulating medium.

Too much cannot be said about the importance of proper furnace venting. This is another factor that has been the cause of many unsatisfactory installations, and has all too frequently reflected back to the manufacturer. It is recommended that all gas vents should be carried to the highest roof point and should terminate with some form

of vent cap that will withstand down drafts. Not so long ago it was generally conceded that a gas vent was merely an opening to the outside for the escape of the products of combustion and that these products would find their way out regardless of the termination point; sort of a safety valve, say. However, this idea was abandoned after much trouble was experienced, usually occurring just when the heating plant was most needed. It was learned that during the most severe cold spell, particularly during a strong wind, the furnaces would fail to operate as the back drafts would smother the flame to such an extent that scarcely any heat was being generated. Also this was the cause of many pilot failures. We must not overlook the fact that in a hard fuel appliance the flue temperature is in most cases sufficiently high to actually establish its own draft but in the later type gas furnaces where higher efficiencies have been established within the furnace itself, then we must properly install the vent so that a draft may be created through natural air currents regardless of the low stack temperatures and heavily moisture laden products of combustion.

The writer hesitates in going into the next subject which should have been treated under "Type of System," as it has some direct bearing on the original selection. This has to do with the various ways and means for the control of gas furnaces. The reason for the hesitancy is that there are so many various ideas as to the proper control, each with its own strong advocates, and in many instances there seems to be no "give or take" among those championing their own methods. Again the writer claims that each type of control has its proper place and adaptation. It is most assuredly a fact that a thermostat control should be made the watch dog in climates where temperatures below freezing are common, but it does not necessarily follow that the thermostat should be used where milder climatic conditions are experienced. In the case of the latter, all too frequently when thermostats are installed the owner forgets his heating system, and in so doing, tries to heat the entire out-of-doors during the night or in the daytime when the outside temperature is slightly under the setting of the thermostat instrument. He has been told that this type control will automatically take care of his heating requirements and is invariably shocked when receiving his gas bill. With the unit type installation it is sometimes advisable to use a thermostat control on one of the main furnaces but even then a push button valve should be installed in conjunction with the thermo valve to assure a proper control for the varying temperatures.

Another vital factor, in designing the system as well as in the installation, is for provision of fresh air both for combustion purposes and room circulation. The first is necessary to obtain the proper primary and secondary air mixtures at the burner to assure of constant and continued efficiency. The second, or fresh air for room circulation, again depends on climatic conditions. In colder climates and where recirculation of cold air is installed, the matter of fresh air is generally taken care of by natural infiltration. In milder climates, however, this does not hold true, particularly when the



DOES THE WHOLE JOB

Heats—humidifies—filters—circulates: A true four-function gas fired air conditioning system. Automatic, quiet, dependable, economical.

Combination above shows Mueller Gas-Era steel furnace and Climator III Air Conditioning Unit having fan, washer, and filters. Also available with other Climators that have fan and filters only. Wide range of capacities and prices. Special burner and combustion chamber provide complete combustion, uniform flame spread, silent operation. Furnace also available in galvanized casing.

Write for Catalog showing our full line of boilers and furnaces, cast and steel, for all size residences.

L. J. MUELLER FURNACE CO., DEPT. WG-8, MILWAUKEE

MUELLER – MILWAUKEE

The Goodman Stopper

The Reliable Shut-off for Street Mains

GOODMAN USED SINCE 1897 2" HANDLE & LOCKING SLEEVE GAS MAIN STOPPER

Equipped with Improved Patented Locking Sleeve, which locks both handles to the pipe. Stopper cannot slip. Gas cannot pass.

Safety Gas Main Stopper Co.
523 Atlantic Avenue, Brooklyn, N. Y.

Pac. Coast Rep.: C. B. Babcock Co.
135 Bluxome Street
San Francisco, California

NRA WE DO OUR PART

furnaces are designed to supply fresh air from the basement or underneath the house. In this case, ample provisions should be made to allow sufficient fresh air entry to the furnace room. In either case the capacity of fresh or cold air to the furnace or furnaces should be equal to or slightly in excess of the entire area being taken from the furnace bonnet. When proper care has not been exercised in the foregoing this also has been found to cause trouble in heating and abuse of the appliance.

Last but not least comes the matter of proper adjustments and servicing of the system after the installation has been completed. The furnace burners should be correctly adjusted for primary and secondary air entrainment and a check should be taken at the meter to see that the proper amount of gas is being supplied for the A.G.A. rating given on the name plate, or instruction card. Too much gas will prove wasteful and dangerous and too small an amount will tend to reduce heating effectiveness. The furnace dampers should then be adjusted and set to give equal distribution throughout the entire house as some runs being shorter than others will naturally rob the larger ones. Also a check should be made to see that the vent pipe is connected properly and is performing correctly, as sometimes during construction the vent stack is mashed or otherwise damaged by careless workmen.

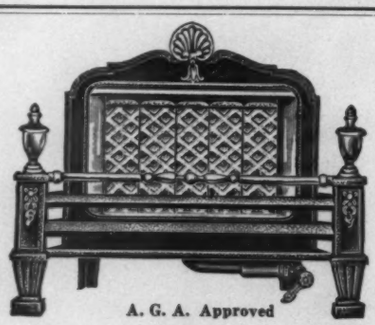
In conclusion the writer wishes to stress the fact that a heating system should never be oversold. The owner should be brought to a point where he has indicated his desires and then these desires should be given thorough and proper consideration as after all he is the one to be satisfied. In a great many instances where his desires are not solicited and a system is forced upon him, he is never quite satisfied although the results obtained are as anticipated by the dealer. Furthermore, do not merely sell a furnace or furnaces but sell a complete heating installation and heating satisfaction. Remember, as aforementioned, that the best furnaces can be ruined if improperly installed. Figure the job from a satisfaction angle and once a price is arrived at for such an installation, stay by your guns and give dollar for dollar value. Only this method will correct the evils in some of the existing practices.

Peoples Gas Light Breaks Water Heater Sales Record

According to T. V. Purcell, vice-president in charge of sales, the Peoples Gas Light & Coke Co., Chicago, Ill., broke all previous monthly sales records in June, selling 907 automatic gas water heaters.

Sales for the first six months of 1935 totalled 3,088 heaters, compared with a total of 2,002 for the entire year of 1934.

The campaign was conducted in cooperation with 550 Chicago plumbers, and its success is attributed to an improved buying power, a liberal rental-purchase plan and a low gas rate for automatic water heaters.


A. G. A. Approved

PEERLESS
RADIANT GAS HEATERS
◆
—will assist materially in your efforts towards
"LOAD BUILDING"
You need have no fear of a service complaint on a PEERLESS

WRITE FOR DETAILS
PEERLESS MANUFACTURING CORP.
1400 W. ORMSBY
LOUISVILLE, KENTUCKY

AIR CONDITIONING
Electrogas
HEATING EQUIPMENT
FURNACES BLOWERS FILTERS WASHERS
Write for attractive Dealer proposition
ELECTROGAS FURNACE & MANUFACTURING CO.
2575 Bayshore Boulevard, San Francisco

American Meter Co. Completes Apparatus Bulletin Series

THE American Meter Co. has just published a laboratory gas testing apparatus bulletin, No. AG-2, which completes a series of six apparatus bulletins, AG-1 to AG-6 inclusive, now available in the loose-leaf 8½ x 11 in. standard size for American Meter Co.'s Sectioniter binder.

The literature is revised to date, describing and illustrating the following products:

AG-1: Meter provers, including the new fine reader and rapid meter testing apparatus, cubic foot bottles, hydropneumatic meter testers.

AG-2: American calorimeter, sulphur and ammonia test, hydrogen sulphide test, specific gravity apparatus.

AG-3: Wet and dry test meters and demonstration meters for numerous applications.

AG-4: Recording and indicating demand meters.

AG-5: Protector siphon gauges, single tube pressure gauges and high pressure differential gauges.

AG-6: Service cleaners, including drip pumps, the new American service cleaner and the Providence vacuum tank.

Bulletin AG-2 will be mailed upon application to the company.

Chaplin-Fulton Mfg. Co. Publishes New Bulletin

The Chaplin-Fulton Mfg. Co., Pittsburgh, Penn., has published bulletin No. 2840, describing the Fulton high-pressure, bronze body regulators. The capacity of these regulators is 2,000 lbs. inlet pressure, and outlet pressures of 50 to 300 lbs. The bulletin contains a price list and a table indicating the sizes required for different pressures together with instructions for installing and setting the bronze body regulators.

Pipe Line Extensions to Begin in South Dakota

Vermillion and Alcester, S. D., have approved natural gas franchises to the Vermillion Natural Gas Co. and the South Dakota Public Service Co. respectively. Vermillion, (population 2,850) will be served from an 11-mile line, construction on which is to begin immediately, tapping Northern Natural Gas Co.'s 14-in. line to Sioux Falls. Completion is expected by September 1.

P. G. and E. Issue Marketed

Pacific Gas and Electric Co. has placed on the market $30,000,000 first and refunding mortgage bonds, series G, bearing 4 per cent, due December 1, 1964. Proceeds from the sale of these bonds will be used to redeem outstanding 5 per cent securities of subsidiary companies, including San Joaquin Light and Power Corp., Midland Counties Public Service Corp. and the Sierra and San Francisco Power Co.

G. R. Pierce Mgr. Texas Centennial

Appointment of George R. Pierce, research engineer for the Lone Star Gas Co., as personnel manager for the Texas Centennial Central Exposition, was announced recently by managing director Walter Cline.

Regulator Freezing

(Continued from Page 19)

There are also a number of compounds that can be used for adsorption. They can be re-activated by heat, but often the heating equipment might be more expensive than the material itself. The one feature that probably detracts the most from the widespread application of adsorbents is that they are selective and may choose the vapors of other substances, such as oils or gasoline which may be present in the gas stream.

Freezing may also be prevented by the use of inhibitors, which lower the freezing point of water with which they are mixed. A well known example of this usage is alcohol. A theoretical calculation can readily be made of the amount of inhibitor necessary to add to the expected amount of water to lower it to the desired freezing point. However, it is also necessary to saturate the gas with the vapor of the compound in order that there may be an excess to be absorbed by the condensing water, so that an additional calculation must be made, and amount added.

Heating Systems

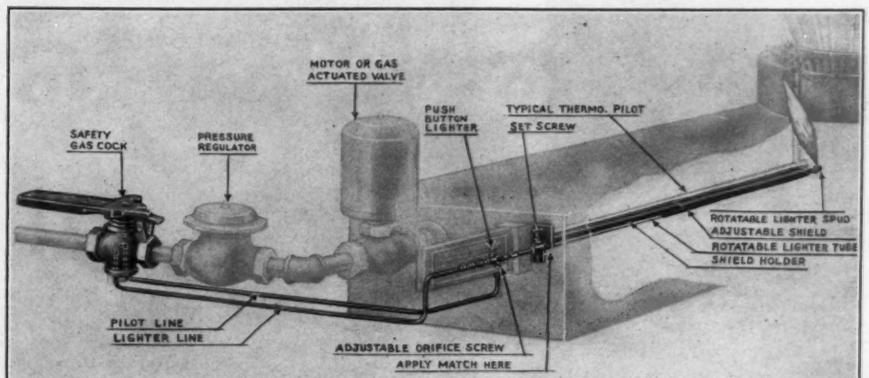
Still another method of preventing freezing is to heat the gas. A system found very satisfactory consists of a jacket around the inlet line of the regulator, and a sidearm water heater. Counter flow with the hot liquid, going in at the bottom and out at the top into an expansion tank in a closed system, is used; a suitable safety valve will take care of difficulties occasioned by leak into the jacket, or failure of the thermostat causing boiling point temperatures of the liquid. A 30 per cent solution of calcium chloride is used. Open systems are not recommended because calcium chloride brine in the presence of oxygen is highly corrosive. Fig. 3 shows a 2-pass and a 3-pass heat exchanger, and a heater system layout for a line already installed.

If the regulator has frozen, the first thing to do is to route the gas through by-pass and relieve the pressure within the regulator. If the formation be due to hydrate this lowering of the pressure will cause the solid matter to melt providing sufficient time is allowed; decomposition may be hastened by wrapping with sacks and pouring on warm water. Before placing the regulator back in service water should be removed from it; otherwise immediate re-freezing may result. In the absence of hot water or if the regulator cannot be removed from service, inject alcohol into the line; calcium chloride brine may also be used for this latter purpose, providing facilities are available for its subsequent removal.

Northern States Power Co. Replaces 50-Year Holder

Northern States Power Co. has scheduled for completion September 1, its $100,000 telescopic gas holder at La Crosse, Wis. on which construction started in May. The new structure will have a 500,000 cu. ft. capacity and replaces a container which has been in operation for 50 years.

Inland Safety Gas Cock and Adjustable External Lighter



DETAIL OF INLAND SAFETY GAS COCK & INLAND ADJUSTABLE EXTERNAL LIGHTER CONNECTED TO A CONVERSION HEATER (PATENTED)

Safety Gas Cock

A gas stop cock for gas conversion burners and gas designed heating appliances.

Its functions are to shut off all gas to the appliance in the CLOSED position, permit only the passage of gas to the pilot lighter and burner pilot in the START position and only to the pilot and burner in the OPEN position.

The sequence of operations is positive. Gas to pilot MUST be turned on FIRST—then a definite secondary operation BEFORE gas can be turned on to burner. Impossible to use lighter with gas passing to burner.

As a shut off valve of some type is essential on all gas heating appliances, the additional cost of using the safety gas cock is the difference in costs of the two.

Its simplicity assures safe customer operation.

Adjustable External Lighter

This lighter is designed for the conversion burner or gas-designed heating apparatus not equipped with an external means for lighting.

Installation is made readily. No part of burner need be removed. Requires only the cutting of an 1 1/8" hole with a circular saw and two 1/4" drillings in the burner front.

Lighter tube and shield may be installed at various angles and adjusted to exact position. Lighter flame can be directed to any angle within 120 degrees by turning lighter tube or lighter spud. Extension tube and shield to raise lighter spud can be furnished.

Equipped with a Rutz push button and an adjustable orifice.

12,500 Safety Gas Cocks used by a single gas company.

INLAND MANUFACTURING COMPANY
1120 N. Cicero Avenue Chicago, Illinois

No. 300

JOHNSON—No. 300 SOFT METAL MELTING FURNACE

Melts soft metals quickly and without forced air blast. Built for long, dependable service. 150 lbs. capacity. Equipped with three powerful Bunsen Burners. Johnson Melting Furnaces are built in sizes ranging from 18 lbs. to 600 lbs. capacity. Write for free catalog.

JOHNSON GAS APPLIANCE CO. Cedar Rapids IOWA

Western Representative: C. B. BABCOCK CO. 135 Bluxome Street San Francisco, Calif.

Eastern Representative: J. H. McPHERSON 250 Stuart Street Boston, Mass.

PATENTED

This Accordion Packing Seals Sulphur, Acids and Alkalies

Accordion Packing rings can be built in all sizes, and made to meet all chemical conditions at any pressure and operating temperature.

They are particularly useful for sealing propane and butane, and other light oils containing sulphur, acids, or alkalies.

Accordion Packing Rings will effectively seal for long periods of time at very low friction. For additional information write for Technical Bulletin No. 390.

The TEXACONE Co.

2007-9 West Commerce P. O. Box 4186
Dallas, Texas

FRASER

Radiant Front Console

Equipped with Fan

Velgrain Finish

The heater that smiles while it warms

Manufactured by

Fraser Furnace Company

Stockton, California

Distributed by

H. R. Basford Company

San Francisco Los Angeles

A.G.A. Commercial Gas Load Symposium

IMMEDIATE necessity for market analyses and surveys to maintain and increase commercial gas load was the keynote of the first Commercial Gas Sales Symposium, conducted under the auspices of the General Commercial Committee of the American Gas Association's Industrial Gas Section in Boston, Mass., June 26. About a hundred engineers attended the meeting. H. A. Sutton of the Public Service Electric and Gas Co. is chairman of the General Commercial Committee.

Among the participants was Roy E. Wright of the New England Gas & Electric Co., who gave a report on the method employed by his company in combatting dwindling load among small users. As an example he cited that servicing boilers in tailor shops had effected a 25 per cent fuel economy, helping to retain this load. Servicing included cleaning tubes, reducing secondary air intake, installing draft hood diverters in flues, insulating and adjusting burners.

W. W. Young of the Connecticut Light & Power Co., in a paper, "Cooperation With Manufacturers and Sales Agencies Handling Commercial Equipment," brought out the fact that since the manufacturer is usually not in the position to see that equipment is properly installed, it behooves the gas company to furnish this service in the interest of retaining load. He recommended further that while rate reductions are instrumental in building and retaining load, more can be accomplished by equivalent budgeting of additional amounts to survey and servicing effort.

W. V. Sullivan of Halliwell, Inc., called attention to gas hair dryers, pointing out that nationally they represent some 100,000,000 cu. ft. of load per month, based on installation figures of about 15,000 units averaging five hoods each, and that there are 60,000 remaining beauty shops in the country not yet equipped with gas dryers.

C. E. Muehlberg of the Consolidated Gas Co., New York, stressed the need for servicing and maintenance of gas equipment to retain the old business and gain new customers in the highly competitive commercial field. Coal and oil companies are now rendering this service, which increases the value of their fuels and has a tendency to decrease the intangible values of gas.

Commenting on his company's method of retaining tailor shop load Mr. Muehlberg said that with the advent of hard times tailors endeavored to curtail their gas bills, which in his territory averaged $23 per month, by turning to kerosene burners for their boilers. This menace to load was combatted by inserting into each tube of the boiler an inexpensive sheet metal strip twisted into a spiral, which increased boiler efficiency by about 15 per cent. And since most of these boilers were found to be about 50 per cent over-gassed, the service men were instructed to clean the boiler, insert the spiral baffles, check the automatic control or try to sell one and make adjustments to bring consumption down to about 90 cu. ft. per hour. Cost for servicing 250 such jobs was an average of about $6 each.

Following is the guide for frequency of servicing calls used by the Consolidated Gas Co., as presented by Mr. Muehlberg:

All industrial customers using an average of 20,000 or over cubic feet of gas per month, for a year, as well as those customers using gas-fired power boilers, shall receive industrial inspections as provided under the following regulations:

1. All industrial customers whose yearly consumption is three million cubic feet per year or more, shall receive monthly inspections.
2. All industrial customers using direct gas-fired unit heaters for process or space heating shall receive monthly inspections during the periods used and quarterly inspections for the periods not in use, unless the gas consumption used on other appliances is at the rate of 250,000 cubic feet per month.
3. All newspapers shall receive monthly inspections.
4. All industrial customers using less than 3,000,000 cubic feet per year, and more than 600,000 cubic feet per year, shall receive quarterly inspections.
5. All industrial customers using power boilers, or other automatic equipment—excepting only automatic copper storage water heaters—shall receive inspections no less frequent than quarterly.
6. All industrial customers using less than 600,000 cubic feet per year, and more than 250,000 cubic feet per year, shall receive semi-annual inspections.
7. All other classes of industrial customers shall receive service on request, only.

C. E. Lucke of the Consolidated Gas Co. brought out that an urgent need exists for a national advertising schedule in trade magazines to offset the effects of competitive fuel campaigns.

The Advertising Promotion Committee, Industrial Gas Section, of which J. P. Leinroth, Public Service Co. of New Jersey, is chairman, has prepared a direct mail campaign for the commercial field. Mr. Leinroth described the campaign, explaining that the advertising pieces are designed to cover the following five classifications:

1. Hotels, restaurants, hospitals, clubs, etc.
2. Delicatessens and bake shops.
3. Tailor shops and pressing establishments.
4. Barber and beauty shops.
5. Counter and food dispensers as in drug stores, etc.

Three mailing pieces for each classification were shown. The campaign program calls for the cooperation of the entire industry in the United States and Canada, companies being urged to participate simultaneously.

Consumers Increase 20 Per Cent on Northwestern Nat. Gas Corp. Lines

An increase of 20 per cent in number of consumers during 1934 has been reported by the Northwestern Natural Gas Corp., serving natural gas to Grandview, Prosser, Sunnyside, Mabton, Zillah, Granger, and Toppenish, Wash. The company is prepared to connect 1,587 additional consumers who are awaiting piping of their homes. Supply is transported approximately 100 miles to the cities from 15 wells in the Rattlesnake Hills field in Benton County in the south-central part of Washington.

"MODERNIZE as you repair"

THE SPRAGUE METER COMPANY

BRIDGEPORT, CONN.

Los Angeles, Calif.
Davenport, Iowa.

San Francisco, Calif.
Houston, Texas.

Entirely **NEW COOKING PRINCIPLES**

One of America's MOST MODERN GAS RANGES

No longer can cooking be considered work nor the kitchen stove the most unattractive feature of the home. Wedgewood engineers have combined beauty with convenience and economy to produce one of America's most MODERN gas ranges. 53 years of range manufacturing experience is refreshingly expressed in the unsurpassed 1935 Wedgewood line. Sizes and types for every home and climate are included. Every detail of construction rigidity, heat retention, efficient combustion, or external beauty and proportion have been carefully studied and developed step by step. Wedgewood is, indeed, one of America's very finest gas ranges.

SPEED - plus - SIMMER
DUAL ALUMINUM BURNERS

The greatest single gas range improvement known. Gives semi-waterless cooking at every top-burner without special utensils.

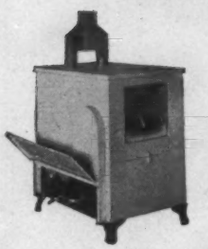
ASTOGRIL BROILER

Thick aluminum grill which cooks both sides of meat at once. Only high-heat conductivity coefficient of aluminum can do this! Other metals fail!

JAMES GRAHAM MANUFACTURING CO.
SAN FRANCISCO • NEWARK • LOS ANGELES, CALIFORNIA
PORTLAND, OREGON

WEDGEWOOD

MODERN EFFICIENT



Safe

Quick

Positive!

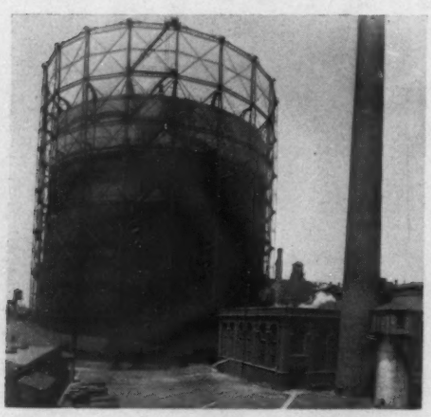
Pacific Forced Air Unit Heater *Illustrated*

PACIFIC'S *Complete* LINE of Gas Appliances Include:

- **Floor Furnaces** • **Cabinet Heaters**
- **Wall Heaters** • **Gas Steam Radiators**
- **Radiant Heaters** • **Water Heaters**
- **Gravity Furnaces** • **Forced Air Furnaces** • **Unit Heaters**

Write for complete information on any or all items

Pacific Gas Radiator Co.
Main Office and Factory
Huntington Park, California
Oldest and Largest Manufacturer of Gas Heating Appliances in the West



Stop Losing Metal

Stop loss of metal on gas holders and pipe lines. NO-OX-ID combines chemical and mechanical protection. Data, recommendations and estimates on request.

DEARBORN CHEMICAL COMPANY
Los Angeles: 807 Mateo Street, Phone TRinity 3385
San Francisco: 421 Bryant St., Phone SUtter 8688

NO-OX-ID
IRON RUST
TRADE MARK
The Original Rust Preventive

Mississippi Company's "Crowning Event" Campaign

WITH "The Crowning Event of 1935" as its banner head, an extensive co-operative appliance sales campaign was carried on in April, May and June by the Mississippi Power and Light Co. of Jackson, Miss. Totals of 827 gas ranges were sold, 221 gas automatic water heaters and 460 gas tank water heaters. The overall campaign quota was exceeded by 47 per cent.

Highlights of the campaign were a comprehensive advertising program, special local shows featuring a "Queen of Yohomia" sound film, prepared especially for campaign use, a beauty parade and cooking school, two "castles on wheels" accompanied by crews of junior salesmen dressed in old cavalier costumes, and a drive on prospects furnished by employees.

All campaign materials appealed to the housewife to free herself from household drudgery through the purchasing of modern appliances, making them her slaves, and thereby crowning herself "Queen of Yohomia, the empire within the walls of your home."

An outline of suggested campaign procedure was mailed to managers of the company's eight sales districts together with the scheduled date for each district. A local appliance show was a feature in each district. Those in charge of local campaigns were urged to take the following steps:

Secure a vacant building capable of seating a record attendance.

Invite the dealers in the district to arrange their displays in the gas company space.

Invite each dealer tn enter an attractive young lady in the "Queen of Yohomia" beauty review, the winner to be crowned "Queen of Yohomia."

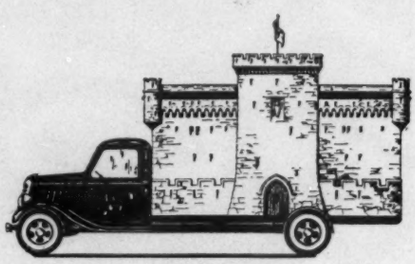
Mail invitations to all homemakers several days prior to the date of the first show.

Plan the show in the following order: Extend a personal welcome to those present; shoot the "Queen of Yohomia" sound film; next parade the beauty contestants and collect the ballots; then introduce the home economist who will proceed with a regular cooking school demonstration during which she will call attention to the various appliances on display.

Castles on Wheels

Two modern "castles on wheels" were built, as illustrated above, containing attractive exhibits of 10 appliances, and toured through all the residential districts within the area of the campaign. The "castles on wheels" were accompanied by five junior salesmen dressed as "Knights of Yohomia" who made a house-to-house canvass of the residential sections giving a brief sales talk, securing prospect information and inviting home-makers to attend the home modernization show and to inspect the "castle on wheels." Senior salesmen then followed up these leads as well as those furnished by prospect cards turned in by company employees. The "castles on wheels" carried especially constructed stages built of packing cases and pipe, designed to be easily set up and dismantled at the show locations. A screen mounted on a roller was pulled down in front of the stage for the film, then raised to disclose a kitchen from which the cooking school was conducted.

Within the sales districts separate quotas were set up for dealer and company sales. Display material, literature for distribution, blank performance forms and truck banners were sent to dealers and district managers.



"Castle on Wheels" used in residential canvassing.

An extensive newspaper advertising campaign together with a schedule of radio programs and billboard displays reinforced the sales drive. Company employees were crowned "Prince and Princess of Yohomia" and were awarded cash prizes for the highest number of sales resulting from prospects turned over to salesmen.

J. J. Powell is the new state supervisor of dealer coordination for the Mississippi Power and Light Co., and played an important part in "The Crowning Event of 1935." H. B. McGehee, sales manager of district No. 1, was crowned "King of Yohomia,' his district having reached a mark of 196 per ecnt of quota.

As an aftermath of the drive an intense "Clean-up Crusade" was begun July 1 to last until August 31, to close remaining prospects. During the crusade employees will continue to turn in prospects. The dealers are invited to participate in this activity also.

Part of Evansville Supply to Come from Kentucky Natural

According to W. J. Hinchey, vice-president and general manager of the Kentucky Natural Gas Corp., the latter has contracted with the Southern Indiana Gas & Electric Co. to supply a part of the natural gas required for distribution in Evansville, Indiana. Delivery under the new contract began June 21. The Kentucky Natural Gas Corp. owns and operates 647 miles of pipe lines connecting gas fields in Indiana and Kentucky with distribution systems in Evansville, Terre Haute, Linton, Boonville, Tell City, Cannelton and Troy, Indiana, and in Owensboro, Bowling Green, Henderson, Hopkinsville and 24 other communities in Kentucky.

Kincaid Distributor for Ward

A. S. Kincaid, manufacturers' agent headquartering in Dallas, Texas, now has the exclusive distributorship for the southwestern states for products of the Ward Heater Co. of Los Angeles, manufacturers of the Ward floor furnace.

DIRECTORY

Byllesby Engineering and Management Corporation

CONSULTING ENGINEERS

General design engineering, investigations, reports and estimates, and construction supervision for new or modernization projects in the utility or industrial fields

231 SOUTH LA SALLE STREET • CHICAGO

• **HYDRAUGER** •

MODERN HORIZONTAL BORING MACHINE

For Underground Installation of Pipe and Conduits. Avoids damage to costly pavements and saves time. Send for Bulletin.

HYDRAUGER CORPORATION, Ltd.

116 New Montgomery St. • San Francisco, California

SUBSCRIPTION ORDER BLANK

WESTERN GAS

310 So. Spring St.,
Los Angeles, Calif.

Gentlemen: Starting with the next monthly issue, you may send WESTERN GAS to the undersigned. Upon receipt of your invoice, remittance will be sent to cover (1 year $2.00) or (2 years $3.00). Other than U. S. $3.00 per year.

Name .....

Title .....

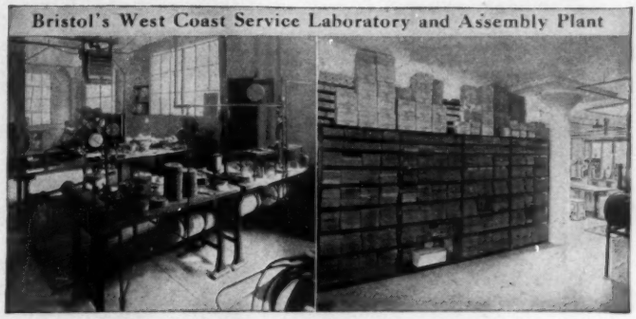
Company .....

Address .....

City and State .....

Date .....

Bristol's West Coast Service Laboratory and Assembly Plant



Build New Life *plus* *automatic control*

INTO YOUR OLD RECORDERS

Perhaps you, too, have a number of Bristol's Recorders that have given fine service for many years. If so, don't think of throwing them away. They're still good as gold,—worth real money to you.

Reconditioning will give them new life. Better yet, modernization into recorder controllers will enable them automatically to control your temperatures or other process conditions within the closest tolerances and make possible exactingly uniform product quality.

Having the work done here by Bristol's West Coast Service Laboratory and Assembly Plant instead of thousands of miles away will save both time and money. Write.

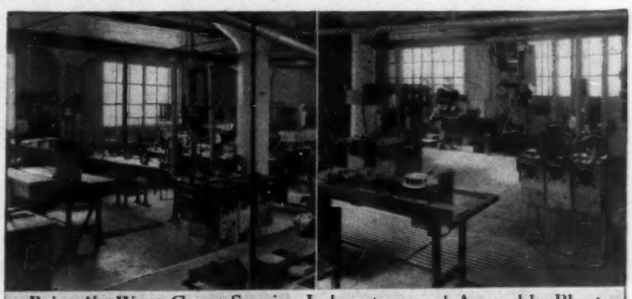
THE BRISTOL COMPANY

Branch Offices: Rialto Bldg., San Francisco . . 747 Warehouse Street, Los Angeles . . Branch Factory: 311 Minna Street, San Francisco

BRISTOL'S

TRADE MARK REG. U. S. PAT. OFF.

PIONEERS IN PROCESS CONTROL SINCE 1889



Bristol's West Coast Service Laboratory and Assembly Plant

Home Service Skit Contest Winners Named

THE Home Service Committee of the A. G. A. conducted a skit contest during the spring months closing on May 1. Thirty-nine skits were submitted, and Ruth Soule, of the Brooklyn Union Gas Co., as chairman of the sub-committee, announces the following cash prize winners:

Claribel J. Adams, Washtenaw Gas Co., Ann Arbor, Mich., first prize, $15.

W. D. Thurber, Southern Counties Gas Co., Los Angeles, Calif., $10.

Madge Peifer, The Syracuse Lighting Co., Inc., Syracuse, N. Y. $10.

E. D. Smith, The Dayton Power & Light Co., Dayton, Ohio, $5.

H. D. Berry, Northwestern Utilities, Ltd., Edmonton, Alberta, Canada, $5.

Myrtie Lloyd, The Dayton Power & Light Co., Dayton, Ohio, $5.

Eleven skits, comprising those submitted by the above, and five additional skits accorded honorable mention, will be assembled at A. G. A. headquarters in a pamphlet to be available to the industry about August 1.

Bankruptcy Petition Filed by Nashville Gas and Heating Co.

Nashville Gas and Heaitng Co., Nashville, Tenn., on July 6, filed petition under section 77-B of the bankruptcy act in the United States District Court for permission to reorganize. A further hearing will be held to determine whether the court shall continue the company in possession of its property or appoint trustees.

Officers Elected for Appliance Society of Oregon

At its first annual meeting held at the Congress Hotel in Portland July 1, the Gas Appliance Society of Oregon elected the following officers:

President: J. H. Anderson, Powers Furniture Co.

Vice-President: L. F. Chess, Chess Plumbing Co.

Treasurer: Walter Widmer, Widmer Plumbing and Heating Co.

Managing director: J. King Byron.

More gas appliances were sold in the territory served by the Portland Gas & Coke Co. in the past year than in any similar period in the past five years, which is attributable in part to the new dealer organization.

Nemec to Establish Branches

Fred A. Nemec, president of the Nemec Combustion Engineers, Whittier, Calif., left in the latter part of July for a one month trip through the Midwest to establish branch offices for the sale and distribution of Nemec equipment in that area. His company has developed a new line of conversion burners including a luminous flame diffusion type.

Opens Salesroom in Newman, Ill.

Tri-County Natural Gas Co. of Westville, Ill., has opened a display room in Newman, Ill., for distributing Skelgas and a full line of ranges and water heaters. Ivan S. Catron was appointed local dealer.

This photograph of 6" Mono-Cast Doublex Simplex Centrifugal Pipe being installed for gas transmission and distribution at Nashville, Tenn., illustrates how you can connect Doublex Simplex Pipe on skids above the trench, then lower it in. Joints test bottle-tight at any pressure, gas or liquid, from 0 to 1000 lbs. This method frequently solves difficult construction problems. For literature write American Cast Iron Pipe Co., Birmingham, Ala.

Southern Counties Sales on Up Grade in 1934

APPLIANCE sales to domestic customers of Southern Counties Gas Co., Los Angeles, Cal., are well above last year in every classification according to Clyde H. Potter, commercial manager. A seven-weeks range sale concluded on June 27th produced 350 sales by the company's 24 salesmen. Indicating the high unit value of ranges sold, Charles H. Smith of Ventura who won first prize in the salesmen's competition sold 39 ranges valued at $4,204. B. H. Ashton of San Pedro sold 31 ranges valued at $3,278, for second place.

Mr. Smith was also high man in Southern Counties' two-month period of competition in the National Range Compaign, during which the company sold 422 ranges of $44,264 net value, and dealers sold 1,226 ranges of $128,332 net value. This represented a combined sale of 1,648 ranges on the system, with net value of $172,597. Range sales for the two-month campaign period represented a total net dollar sale of $116.32 per 100 meters.

New Service to Replace Lexington High-Pressure System

The distribution system of the Central Kentucky Natural Gas Co., Lexington, Ky., will soon include the south side of Lexington, comprised of the Rosemont Garden, Suburban Court and Penmoken Park districts. This area is now supplied by the Louisville Gas and Electric Co., off its 81-mile high-pressure line.

Originally the Louisville Gas and Electric Co. laid the high-pressure line through this area, then a sparsely settled farming community, and agreed to supply certain farms at rates no higher than prevailed in Louisville in order to obtain the right-of-way. The community was subdivided and gradually grew, until now it is a part of Lexington proper, and as such will be served in the future by Central Kentucky Natural Gas Co. distributing in Lexington.

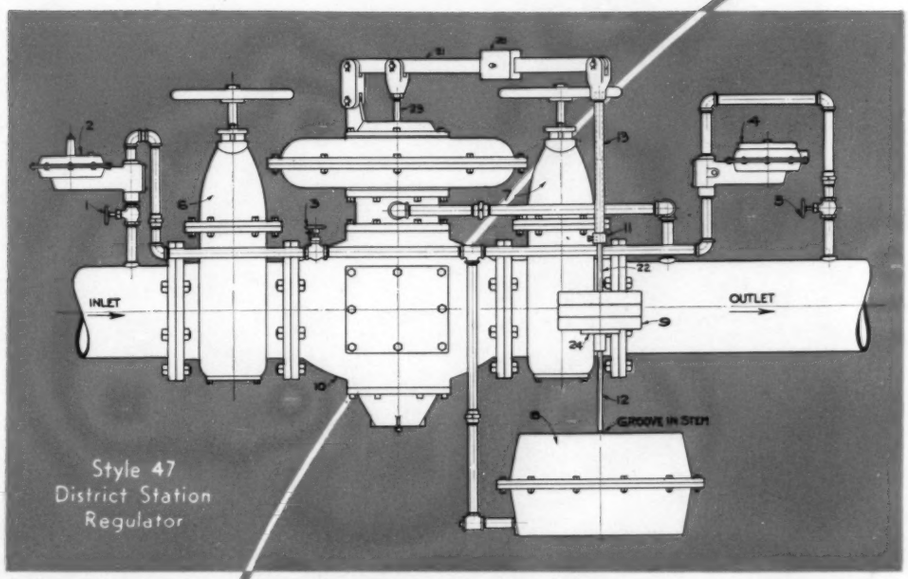
Direct Mail Portfolio for Commercial Load Building

The Industrial Gas Section of the American Gas Association has published a portfolio for use by local companies promoting commercial gas sales through direct mail advertising. The campaign is intended to increase commercial gas load in the following fields where it is competitive with other fuels: Hotels, restaurants, clubs, institutions; delicatessens and bake shops; tailor and pressing shops; barber and beauty shops; counter food dispensers.

The portfolio, containing samples of all mailing material, was recently mailed to all association members.

Deming May Get Natural Gas

Federal approval for the laying of a municipally owned natural gas distribution system in Deming, N. M., to be financed out of PWA funds, is pending. The proposed system will serve approximately 180 consumers, and will be fed by a 4-in. main about 3 miles long connecting with the Western Gas Co.'s 12-in. line from El Paso.



Style 47
District Station
Regulator

CHECK √ THESE *Proven* FEATURES

of Mueller-Groble District Regulators

Mueller-Groble District Regulators reduce varying initial pressures up to 75 pounds per square inch to constant distribution pressure in inches of water column—and their sensitive control accompanied by low maintenance cost has made them the choice of gas distribution engineers in all sections of the country.

Perfectly balanced valves, combined with unrestricted valve travel and maximum port openings, assure full capacity under all conditions. There are no stuffing boxes to leak or stick and interfere with the smooth operation of the regulator.

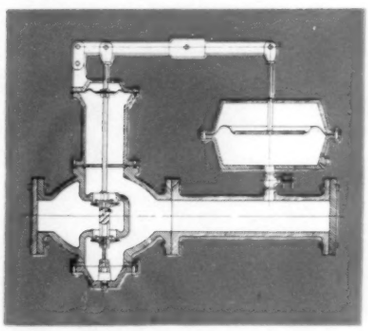
We believe you will be interested in checking some of the features of these regulators. They are:

- ☐ Two piece valve construction which permits valve inspection and disc renewal without dismantling.
- ☐ Large bolted inspection plates on both sides of valve body which give maximum accessibility in close quarters.
- ☐ Auxiliary bowl may be installed at any 45° angle from the main for flexibility of installation.
- ☐ Waterproof construction available for protection in case of flooding; also removable bronze valve seats for abrasive conditions.
- ☐ Auxiliary control gives more sensitive regulation and positive shut-off with operating power from high pressure side.
- ☐ Each regulator tested under actual service conditions before shipment and Factory Test Record furnished, together with complete instructions for installing and operating.
- ☐ Quality materials, skilled workmanship, and rigid inspection assure close control, low maintenance cost, and long life for each unit.

There is a suitable type of Mueller-Groble District Regulator for practically any application. Our Engineering Department will be glad to assist you in selecting regulators suited to your needs.

MUELLER CO., Decatur, Ill.

Factories: Decatur, Ill.; Chattanooga, Tenn.; Los Angeles, Calif.; Sarnia, Ont.
Branches: *New York and San Francisco*



For industrial installations requiring a regulator of 2 inch pipe size or larger, this Style 126 Industrial Regulator is unsurpassed for accurate control and low installation cost. Furnished for direct or remote control. Ask for facts and prices.

WRITE FOR YOUR COPY
of the new 52-page Mueller-Groble Catalog.

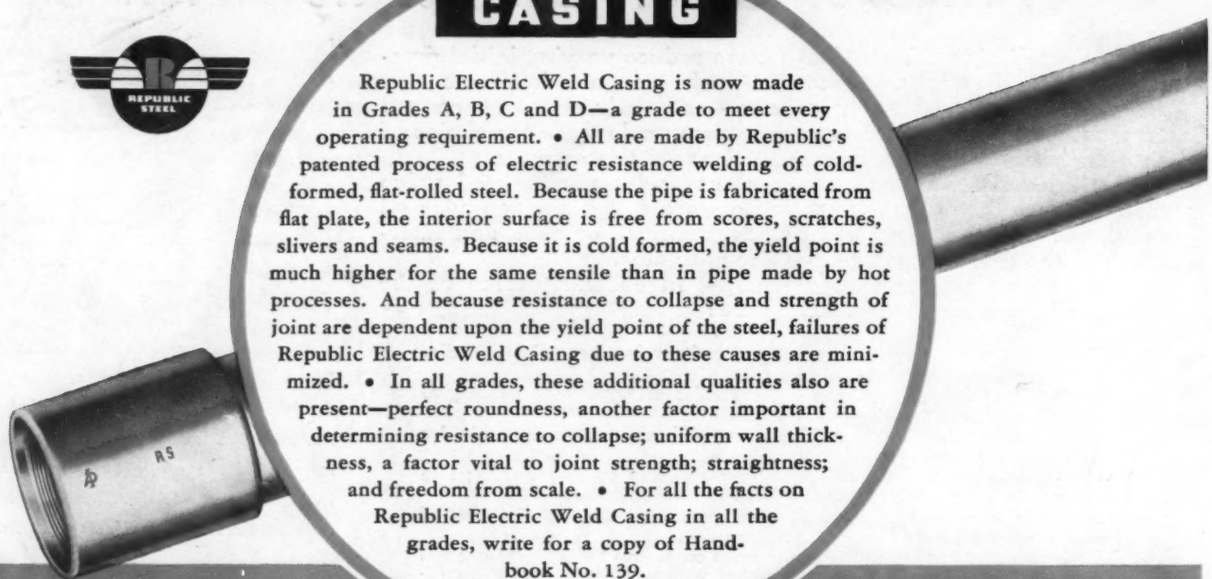
MUELLER

GROBLE LINE GAS REGULATORS

HIGH YIELD POINT...
WITH
HIGH DUCTILITY...

YOU'LL FIND THIS REMARKABLE ACCOMPLISHMENT IN

REPUBLIC
ELECTRIC WELD
CASING



Republic Electric Weld Casing is now made in Grades A, B, C and D—a grade to meet every operating requirement. • All are made by Republic's patented process of electric resistance welding of cold-formed, flat-rolled steel. Because the pipe is fabricated from flat plate, the interior surface is free from scores, scratches, slivers and seams. Because it is cold formed, the yield point is much higher for the same tensile than in pipe made by hot processes. And because resistance to collapse and strength of joint are dependent upon the yield point of the steel, failures of Republic Electric Weld Casing due to these causes are minimized. • In all grades, these additional qualities also are present—perfect roundness, another factor important in determining resistance to collapse; uniform wall thickness, a factor vital to joint strength; straightness; and freedom from scale. • For all the facts on Republic Electric Weld Casing in all the grades, write for a copy of Handbook No. 139.

Republic Steel
CORPORATION
GENERAL OFFICES · · · YOUNGSTOWN, OHIO